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Bay Area Transportation State of the System 2003

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Bay Area Transportation:
State of the System
2003

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The Authoring Agencies

Metropolitan Transportation Commission (MTC)

MTC is the transportation planning, coordinating and financing agency for the nine-county San Francisco Bay Area. The agency also helps to monitor and — in concert with Caltrans and others — to improve the operation of the regional transportation network.

Caltrans District 4

Caltrans District 4 is the operating arm of the California Department of Transportation (Caltrans) for the nine-county San Francisco Bay Area. Caltrans is responsible for the planning, design, construction, maintenance and operation of the state highway system (and the Interstate Highway System in California), and is the state's overall manager of interregional transportation services.

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To Users of the Bay Area Transportation System

We are pleased to present *Bay Area Transportation: State of the System 2003*, a digest of key data on the performance of the region's transportation network and facilities. This is the second in an annual series of reports inaugurated last year by the Metropolitan Transportation Commission (MTC) and Caltrans District 4. In this collaborative effort, we compile, display and briefly comment on statistics that reveal how the Bay Area transportation system is performing and how travel conditions are changing. Taken together, the many pieces of data included in this report combine to provide a comprehensive overview of the state of transportation in the Bay Area.

In 2002, the year covered by this report, continued sluggishness in the region's economy eased the demands placed on the Bay Area's transportation system. The effects of this trend are evident in the data presented here. Some highlights include:

- a 5 percent reduction in congestion on the region's freeways — on top of a 12 percent decline in 2001 (pages 8–11);
- a 3 percent reduction in transit ridership (pages 28–29);
- a decline of 7 percent in the number of passengers flying into or out of Bay Area airports (page 48).

While congestion reduction caused by an economic slowdown is at best a mixed blessing, reductions in the number of collisions involving injuries and fatalities is always a welcome development, and this was another noteworthy highlight in 2002 (pages 32–33). Motor vehicle collisions involving pedestrians and cyclists also were down last year, for the fifth year in a row (pages 34–35).

This year we have added data on transit travel times to the section on "Selected Commute Times" (pages 12–15), which last year featured freeway drive times only. This addition makes for interesting comparisons between the two modes on popular commute routes to San Francisco, Oakland and San Jose. We also have added information on pedestrian- and bicyclist-involved collisions by jurisdiction (pages 34–35, and Appendix C), which greatly expands the detail provided on this important measure of transportation safety.

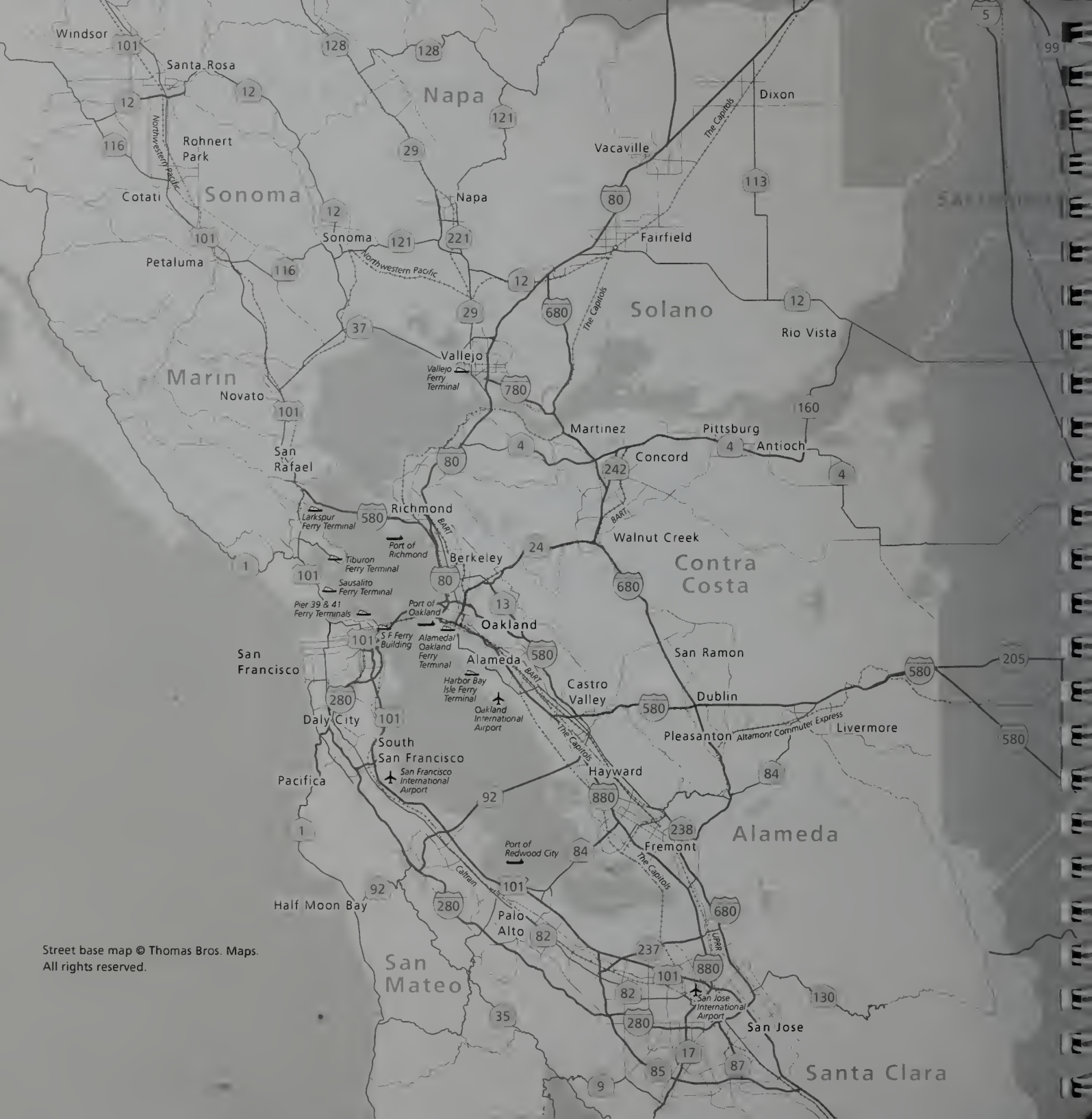
We invite you to page through this sophomore issue of the *State of the System* report. We hope that you will find its contents informative and useful, and we welcome your comments as to both subject matter and presentation.

On behalf of the Metropolitan Transportation Commission and Caltrans District 4, thank you for your interest in Bay Area transportation.

Sincerely,

Steve Heminger
Executive Director
Metropolitan Transportation Commission

Bijan Sartipi
District Director
Caltrans District 4



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The Transportation System in Brief

Nearly 7 million people call the San Francisco Bay Area home, but they are hardly a stay-at-home group. To get to work, school, shopping or other activities, the region's residents made more than 21 million trips on an average weekday in 2002, about 17 percent more than in 1990. Most of these trips are made by car (84 percent), with walking and bicycling being the next most common mode (10 percent), followed by public transit with 6 percent of trips. Over the course of a year, over 500 million transit trips are taken, and close to 30 billion miles are logged on the region's freeways (see table below).

Taking a closer look at the data in the table below, we can see that Bay Area population has grown in each of the last five years, though at a slower rate in 2002 than in prior years. However, employment has fallen back since peaking in 2000. Between 2000 and 2002, the region lost over 200,000 jobs in the bursting of the high-tech bubble. Reflecting, in part, the drop in employment, the number of transit trips decreased by 3 percent in fiscal year 2001-02, after peaking at 533 million trips the year before. Still, transit ridership recorded a 9 percent overall increase from fiscal year 1997-98 to 2001-02.

Going forward, projections indicate that population will continue to increase in the Bay Area, driven by revived job growth. By 2025, the region's population is expected to grow to 8.2 million people and employment will expand to nearly 5 million jobs. More people means more travel and increased pressures on regional and local transportation systems. Maintaining mobility will require wise investment of always-limited resources. MTC and the region will wrestle with how best to accomplish this in the coming year, as the long-range transportation plan for the region, dubbed Transportation 2030, is developed with the aid of transportation partners and public input.

The Freeway System

The Bay Area's 620-mile freeway system is the workhorse of the transportation network. In 2002, vehicles traveled more than 29 billion miles on Bay Area freeways — about 60 percent of all miles driven by trucks and passenger vehicles in the region. The roving tow trucks of the Freeway Service Patrol cruise along some 450 miles of the most congested freeways and expressways, helping motorists with car trouble, removing debris or quickly clearing accidents.

Population, Employment and Travel in the Bay Area, 1998–2002

	In Thousands					Percent Change	
	1998	1999	2000	2001	2002	2001–2002	1998–2002
Residents	6,614	6,703	6,818	6,917	6,956	+1%	+5%
Jobs	3,298	3,388	3,541	3,506	3,334	–5%	+1%
Vehicle Miles Driven on Freeways	27,074,800	27,657,600	28,654,600	28,996,200	29,190,800	+1%	+8%
Transit Trips	474,200	481,985	506,107	533,038	514,958	–3%	+9%

Sources: California Employment Development Department, California Department of Finance, Caltrans, Metropolitan Transportation Commission

Transit trips data is compiled by fiscal year, e.g., data listed for 1998 represents July 1, 1997–June 30, 1998.

Closer Look at Commuting – Commuting to work accounts for roughly a quarter of all Bay Area trips. According to data from the 2000 Census, the average commute in 2000 was 29.4 minutes, an increase of nearly 15 percent from 1990. As with all trips, most commute trips are by private vehicle; 68 percent of work trips are by people driving alone and 13 percent by people in carpools and vanpools; 10 percent take transit and 3 percent walk. The Census reports that 4 percent of workers work at home and do not commute.

Every year since 1992, RIDES for Bay Area Commuters, Inc. has conducted a survey of its own to understand Bay Area commuting patterns and promote ridesharing. While not as comprehensive as the Census, the RIDES survey helps to provide insight into why people make the choices they do and how they feel their commutes have changed.

In 2002, RIDES asked solo commuters why they drove to work alone. The most popular responses were: no one to carpool with (22 percent); work hours or schedule (18 percent); no practical transit options (14 percent); and need for vehicle during work (11 percent). In surveying transit commuters, RIDES found the most common reasons people gave for taking transit were: don't own a car (19 percent); comfort/relaxation (17 percent); parking unavailability or cost (13 percent); commuting cost (13 percent); and travel time (12 percent).

(continued on facing page)

The freeway system includes 298 miles of "diamond lanes" that allow people in carpools, vanpools and buses to bypass congestion during peak commute hours. In 2002, carpool lanes carried 15 percent of the vehicles and 28 percent of the people in the peak commute hour on freeway segments with carpool lanes.

The Local Roadway Network

Bay Area cities and counties maintain more than 19,000 centerline miles of local roadways, which must balance the needs of bicyclists and pedestrians as well as those traveling by buses and private automobiles. About half of the traffic signals on the region's local roadway system are timed to reduce the amount of time people spend waiting at red lights. In some major bus corridors, signals are programmed to give preferential treatment to buses that are running late so they can get back on schedule.

The Public Transit System

In fiscal year 2001-02, Bay Area transit operators provided 188 million vehicle miles of service and carried 515 million passengers. Buses provide nearly half of all service miles and carry two-thirds of all passengers. BART, commuter rail, light rail, ferries, and door-to-door vans and taxis that serve elderly and disabled riders (called paratransit service) carry the remaining third. The region's operators have long been recognized as leaders in making the transit system accessible to persons with disabilities. Today, more than 90 percent of the region's buses and 94 percent of transit centers and rail stations are accessible to persons using wheelchairs.

Pedestrian and Bicycle Facilities

The ability to get around safely on foot or by bicycle is increasingly recognized as an essential factor in a neighborhood's quality of life. Also, there is a growing recognition that walking and cycling can help to promote healthier lifestyles and combat health conditions associated with

decreasing levels of physical activity, such as obesity and diabetes.

The network used by bicyclists and pedestrians is ubiquitous. It includes the entire local roadway system, as well as sidewalks and some dedicated pathways. In addition, most buses and trains now accommodate bicycles. Bicycles and pedestrians are excluded from freeways for safety purposes, but access is provided on Bay Area bridges, either through bicycle lanes, special vans or transit service connections. Still, there are numerous locations without sidewalks or bicycle lanes; in such cases, bicyclists and pedestrians must share a lane with traffic. The safety of pedestrians and cyclists is a topic of increasing concern, and programs such as Safe Routes to School and other safety initiatives are being deployed by jurisdictions around the region.

The *2001 Regional Transportation Plan* proposed a 1,900-mile network of regionally significant bicycle facilities; the plan also identified gaps in city- and county-level bicycle plans and recommended specific improvements to fill these gaps. Approximately 35 percent of the regional network exists today. Regionwide, bicycling accounts for 1 percent of all trips, and walking accounts for about 9 percent. However, for trips to school, bicycling accounts for about 4 percent of trips and walking for more than 20 percent.

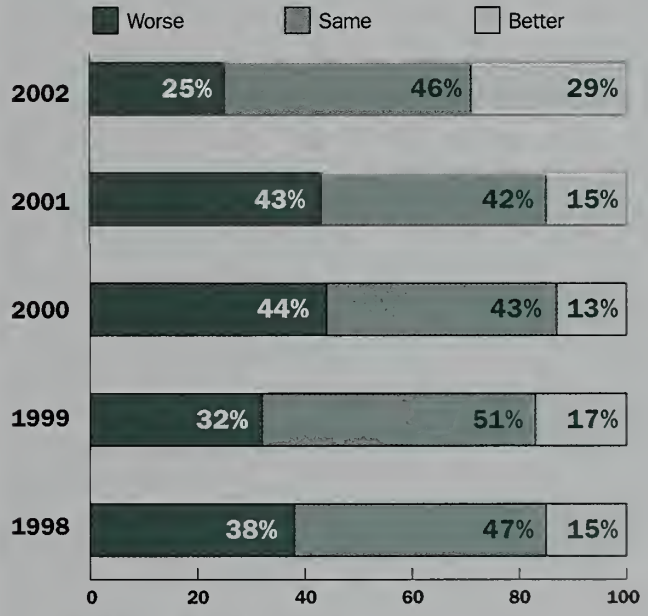
Airports and Seaports

The region's airports and seaports are gateways to the rest of the country and the world for tourism, business travel and trade. Most residents are familiar with the major international airports in San Francisco, Oakland and San Jose. Less well known are the region's five major seaports and their cargo specialties: Oakland (container cargo); San Francisco and Redwood City (construction materials); Benicia (automobiles and petroleum coke); and Richmond (gasoline and oil). Handling over 54 million passengers and 1.7 million containers a year, the Bay Area's airports and seaports also generate considerable ground traffic in surrounding areas.

(continued from previous page)

As shown below, the RIDES survey also showed that people viewed their commute more favorably last year than in the years just prior. In 2002, 29 percent of those surveyed felt their commute had improved, while only 25 percent felt the opposite. In 2001, only 15 percent felt better about their commute, and 43 percent reported that it had gotten worse.

Percent of Commuters Who Claim Their Commute Is Better or Worse Than Last Year



Source: RIDES for Bay Area Commuters, Inc.

Mobility: Getting Around the Bay Area

Mobility can be defined as the ease of getting around. This section includes statistics describing how easy (or difficult) it was to get around the Bay Area on freeways, local roadways and transit, as well as statistics on the number of vehicles and people that used each of these systems in 2002.

Traffic congestion and travel time are used to describe ease of travel on freeways. Statistics on vehicles using freeways include the total number of vehicles and total number of trucks at selected locations. The report presents separate statistics on travel time savings offered by carpool lanes and the number of vehicles using carpool lanes.

Measuring the ease of travel on the local road network is more challenging because the network is so extensive and is managed by more than 100 different cities and nine counties. Most jurisdictions use an indicator of congestion called "level of service," which corresponds roughly with traffic congestion. This report does not include traffic volumes on local roadways because this information is not consistently monitored or reported. We hope to fill this gap in future reports.

Schedule adherence (on-time performance) is used to describe ease of travel on transit. To track transit usage, the report includes annual ridership statistics reported by operators to the Federal Transit Administration.

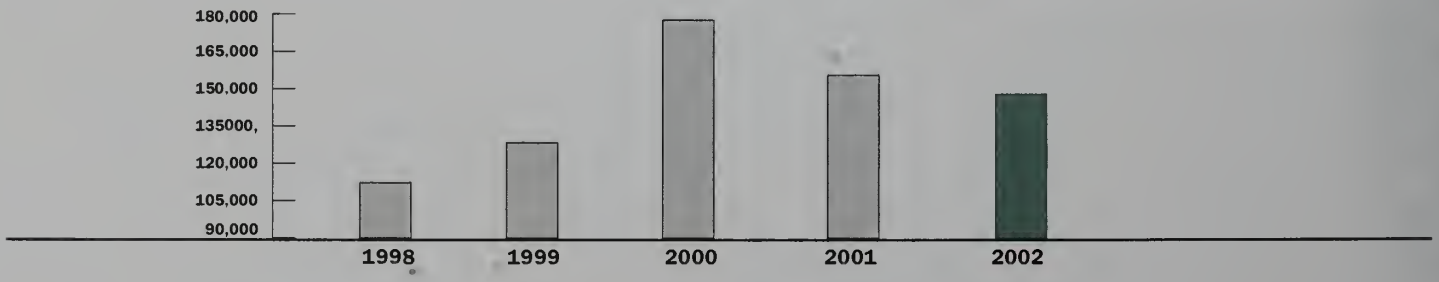
Regional Congestion Eases for Second Straight Year, But Conditions Vary Widely by County

Freeways continued to flow more freely in 2002, as the sluggish Bay Area economy shed more jobs and fewer road warriors vied for precious roadway space during peak commute hours. The number of vehicle hours of delay due to congestion dropped by 5 percent last year, after sliding 12 percent in 2001. Regionwide, vehicles spent 147,900 hours per day in congested conditions (defined as average speeds below 35 miles per hour for 15 minutes or more on a typical weekday) on Bay Area freeways in 2002, well below the 177,600 hours per day notched in 2000, at the high-water mark of the dot-com boom.

But the mild regional relaxation in gridlock conditions was not spread evenly among the counties of the Bay Area. A look at the table below reveals wide disparities in con-

Daily Freeway Delay by Bay Area County, 1998–2002

		Daily (Weekday) Vehicle Hours of Delay					Percent Change	
	Freeway Miles (2002)	1998	1999	2000	2001	2002	2001–2002	1998–2002
Alameda	138	41,800	44,300	61,700	65,600	61,300	–7%	+47%
Contra Costa	87	14,000	14,500	16,200	18,800	19,400	+3%	+39%
Marin	28	7,200	7,700	9,900	7,900	8,400	+6%	+17%
Napa	5	0	0	0	0	0	0%	0%
San Francisco	19	6,900	9,100	12,500	8,500	11,400	+34%	+65%
San Mateo	73	9,800	11,500	18,100	10,900	7,700	–29%	–21%
Santa Clara	137	29,300	36,900	51,700	37,000	31,600	–15%	+8%
Solano	79	400	700	3,200	2,400	3,700	+54%	+825%
Sonoma	55	2,800	3,600	4,300	4,400	4,400	0%	+57%
Bay Area	**621**	**112,200**	**128,300**	**177,600**	**155,500**	**147,900**	**–5%**	**+32%**



Source: Caltrans District 4

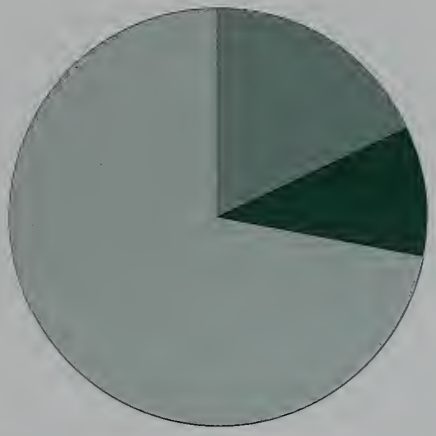
gestion readings for the year, with results ranging from a 29 percent falloff in San Mateo County to a 54 percent increase in fast-growing Solano County. And while some old standbys retained their rankings among the region's worst congestion locations at the corridor level, several East Bay newcomers muscled their way onto the list of traffic hot spots (see table on page 10).

Daily delay fell for the second straight year on Santa Clara County freeways, dropping to the lowest level since 1998. Improvements to the Interstate 880/Route 237 interchange were completed in 2002, and this may help explain some of the decrease in congestion. But, as in 2001, the traffic-reducing effect of the slump in the South Bay's high-tech economy was clearly at work as well. Likewise for San Mateo County, where the 29 percent drop in vehicle hours of delay brought congestion to its lowest point since 1996. New auxiliary lanes on U.S. 101 and the November 2002 widening of the San Mateo-Hayward Bridge certainly eased pressures on county freeways, but economic stagnation likely played a much larger role.

Yet as traffic thinned in the South Bay, it thickened noticeably in some North Bay and East Bay locations. Solano County resumed its recent rise in the annual congestion tallies, with congestion jumping by 54 percent in 2002 (following a pullback of 25 percent in 2001). Year-to-year swings are more noticeable in counties such as Solano, where the absolute hours of delay are still relatively low. In the East Bay, Contra Costa County saw congestion grow slowly but steadily, as it has every year since 1998. The number of daily vehicle hours of delay is now at the highest level ever. In Alameda County, congestion was down overall by 7 percent since 2001, but traffic growth in the Tri-Valley area in the eastern part of the county caused two segments of Interstate 580 to climb higher up the list of the Bay Area's most congested locations in 2002 (see table on next page).

Appendix B lists delay on all freeway segments for the morning and evening commute periods in 2002.

Travel Speeds on Bay Area Freeways In Peak Commute Periods
[5 a.m.–9 a.m. and 4 p.m.–8 p.m.]



Source: Metropolitan Transportation Commission
Based on analysis of data for 1999–2001

Commute-Hour Congestion Not Systemwide — An interesting footnote to the discussion of travel and delay is the fact that a large portion of the Bay Area freeway system operates at fairly good speeds during the commute period, notwithstanding the considerable congestion at certain key points. Based on data from 1999–2001, MTC estimates that approximately 72 percent of the vehicle miles traveled during peak commute periods were at speeds over 50 miles per hour.

Freeway Congestion (continued)

Gridlock's Top 10 — When Caltrans District 4 compiles its list of the 10 freeway locations with the worst congestion during the morning and evening commutes, some regional hot spots reliably make appearances year after year. The morning backup along Interstate 80 leading to the Bay Bridge is a staple of Bay Area commuting, and it again topped the list of congestion locations in 2002. The slog down Interstate 880 in southern Alameda County is another familiar nemesis of workbound motorists, and 2002 was no exception. But 2002 also saw the emergence of two new freeway segments as major trouble spots: Interstate 580 from Vasco Road to Airway Boulevard in eastern Alameda County and Route 4 from Hillcrest Avenue to Loveridge Road in Contra Costa County. Both these stretches cracked the top 10 list of most congested locations in 2002. Sliding down the list of slow spots, meanwhile, was the Sunol Grade segment of Interstate 680, which fell to eighth most congested location, down from number three in 2001. A new auxiliary lane (opened in 2001) likely accounted for some of the reduction in congestion.

Bay Area Freeway Locations With Most Delay During Commute Hours, 2002

2002 Rank	Location	2002 Daily (Weekday) Vehicle Hours of Delay	2001 Rank	2000 Rank	1999 Rank	1998 Rank
1	**Interstate 80, westbound, a.m. —** Alameda/Contra Costa County *Willow Avenue to Bay Bridge metering lights*	9,710	1	1	1	2
2	**Interstate 880, southbound, a.m. —** Alameda County *Thornton Avenue (Route 84) to north of Dixon Landing Road*	8,880	2	3	3	5
3	**Interstate 580, eastbound, p.m.** — Alameda County *Hopyard Road to west of El Charro Road*	7,040	5	13	13	13
4	**Interstate 80, eastbound and U.S. 101, northbound, p.m.** — San Francisco County *Cesar Chavez Street to west end of Bay Bridge*	5,960	4	5	4	10
5	**Interstate 580, westbound, a.m.** — Alameda County *Vasco Road to Airway Boulevard*	3,910	12	14	17	26
6	**Interstate 880, northbound, p.m. —** Santa Clara/Alameda County *Montague Expressway to Dixon Landing Road*	3,660	7	12	5	41
7	**Route 4, westbound, a.m. —** Contra Costa County *Hillcrest Avenue to Loveridge Road*	3,640	15	32	26	37
8	**Interstate 680, southbound, a.m.** — Alameda County *Sunol Road to south of Route 262*	3,600	3	2	2	1
9	**U.S. 101, southbound, a.m.** — Marin County *Rowland Boulevard to Interstate 580*	3,520	8	6	7	4
10	**Route 84, westbound, a.m.** — Alameda County *Newark Boulevard to Dumbarton Bridge toll plaza*	2,860	10	11	9	6

Source: Caltrans District 4

Rankings are for routes in which continuous stop-and-go conditions occur with few, if any, breaks in the queue. Thus, corridors that have equally severe delays but where congestion is broken into several segments may rank lower in this type of congestion listing.

Gridlock's Top 10, 2002
Napa
Sonoma
Santa Rosa
Solano
Vacaville
Fairfield
Petaluma
Novato
Rio Vista
Vallejo
Marin
San Rafael
Concord
Brentwood
Richmond
Walnut Creek
Contra Costa
Danville
Oakland
San Francisco
Livermore
Pleasanton
Hayward
San Mateo
Fremont
Alameda
Palo Alto
San Mateo
San Jose
Santa Clara
Los Gatos
Morgan Hill
Gilroy
Congested segment with direction of travel
Rank of segment in top 10 congested locations (1 is most congested.)
N
Miles
0 10 20 30
Kilometers
0 10 20 30
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Freeway Commute to San Jose Is Quicker in 2002; Vallejo Ferry Speeds Riders to San Francisco

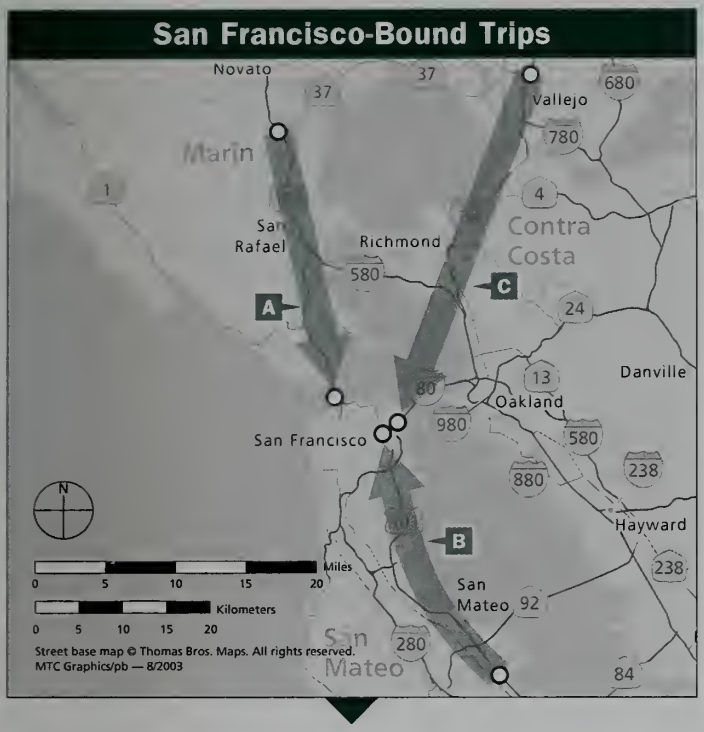
Travel times for those commuting into the region's three largest cities (San Francisco, Oakland and San Jose) followed no particular trend in 2002, varying by destination and — in some cases — by travel mode. With the high-tech economy still struggling and fewer workers jostling for space on Silicon Valley freeways and connecting routes, San Jose-bound commuters realized some significant time savings (see table on page 15). The most dramatic example of this occurred on the morning commute over the Sunol Grade on Interstate 680, where drivers shaved nearly a half hour off their trips, compared to 2001. In the East Bay, meanwhile, commute times to Oakland held steady in 2002 for both transit and freeway commuters (see table on page 14). Among those headed to San Francisco, commute times on freeways actually rose last year, but ferry riders out of Vallejo were able to sail past the backup on Interstate 80 and arrive downtown 25 minutes earlier than their road warrior brethren, proving that mode does matter on some commute segments.

Driving times for the popular morning commutes displayed here are calculated using the freeway congestion data gathered by Caltrans. The selected commutes assume drivers use the main freeway routes between the origin and destination points, and it is further assumed that the drivers travel in regular, mixed-flow freeway lanes (not carpool lanes) and that no accidents or unusual delays are encountered en route.

This year, transit travel times are displayed for trips that originate from the same general locations as their companion freeway commutes. The transit travel times were calculated from printed schedules, or by using the TakeTransit℠ trip planner available on the MTC-sponsored 511.org Web site. Transit travel time refers to the elapsed time between the starting and ending transit stops or stations. Like the freeway travel times, transit travel times do not include the time it takes to get from home to the point of embarkation or from the destination stop to the workplace, and it is assumed that no delays are encountered en route.

Among the commutes examined here, transit alternatives generally run second to freeway commutes in terms of overall travel time, with the big exception being the Vallejo-to-San Francisco route. Riding BART is a quicker way to get from Walnut Creek to Oakland (by a few minutes), and the Hayward-to-San Jose run on Amtrak ties with its freeway counterpart, but for every other commute the freeway route is quickest.

Of course, factors other than speed (such as cost, convenience and reliability) figure into most commuters' calculations and should be borne in mind when making straight mode-to-mode comparisons of travel times. As morning and evening traffic reports attest, accidents often cause unexpected delays on Bay Area freeways. This means that travel times on a given freeway segment may exhibit a rather high degree of variability. By contrast, transit systems, such as Caltrain and BART, that run on their own tracks offer a more reliable commute.



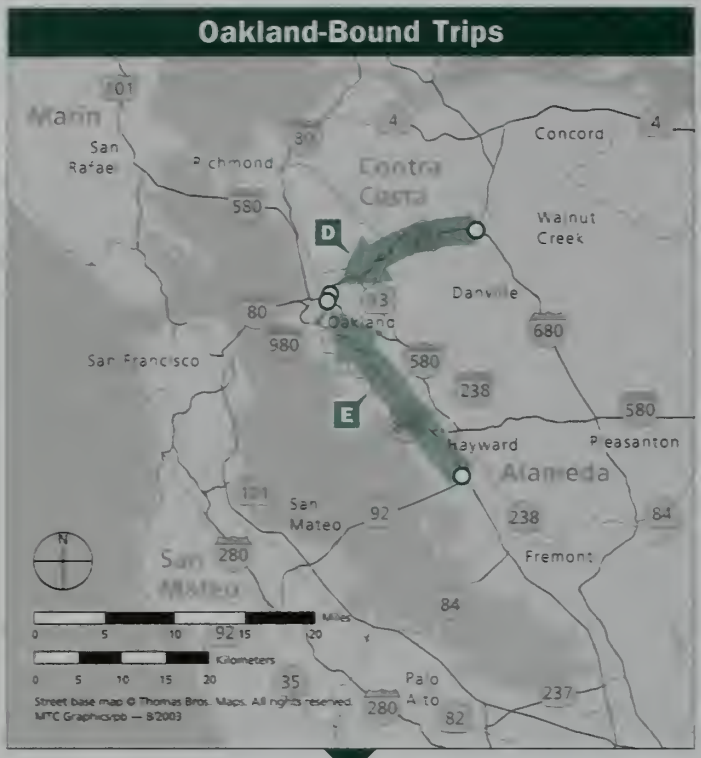
Travel Time for Selected Commutes to San Francisco (arriving at 8:30 a.m.), 1998 – 2002

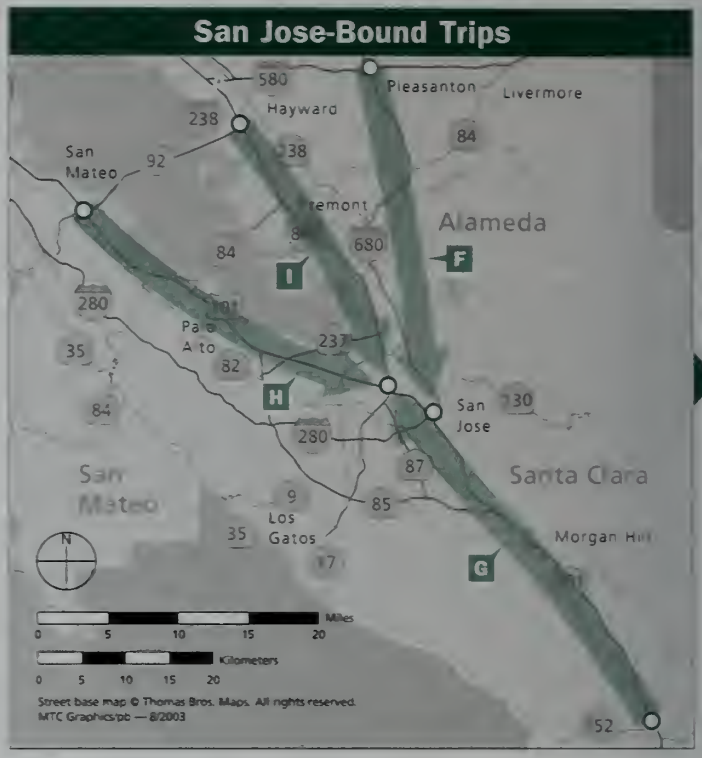
		Travel Time in Minutes					Change in Minutes	
		1998	1999	2000	2001	2002	2001–2002	1998–2002
A	***From Novato*** **Freeway** — *U.S. 101 southbound from Novato to Route 1 junction in San Francisco (28 miles)*	60	66	69	55	57	+2	–3
	Transit — *Golden Gate Transit Route 80 from Novato to San Francisco Civic Center (29 miles)*	NA	NA	NA	NA	71	NA	NA
B	***From Redwood City*** **Freeway** — *U.S. 101 northbound from Redwood City to Interstate 80 junction (24 miles)*	34	33	32	26	35	+9	+1
	Transit — *Caltrain from Redwood City station to San Francisco station at 4th Street and Townsend (26 miles)*	NA	NA	NA	NA	46	NA	NA
C	***From Vallejo*** **Freeway** — *Interstate 80 westbound from Route 37 in Vallejo to 5th Street (32 miles)*	63	70	87	82	80	–2	+17
	Transit — *Vallejo Ferry Terminal to the San Francisco Ferry Building (27 miles)*	NA	NA	NA	NA	55	NA	NA

Sources: Caltrans District 4 and Metropolitan Transportation Commission

Transit travel time not collected prior to 2002
Freeway travel times assume typical travel conditions, with no accidents. Transit travel times assume scheduled times.

Selected Commute Times (Freeway and Transit) continued





Travel Time for Selected Commutes to Oakland (arriving at 8:30 a.m.), 1998 – 2002

		Travel Time in Minutes					Change in Minutes	
		1998	1999	2000	2001	2002	2001–2002	1998–2002
D	***From Walnut Creek***							
	Freeway — *Route 24 westbound from Interstate 680 junction in Walnut Creek to Interstate 580/980 junction (14 miles)*	19	17	20	26	26	0	+7
	Transit — *BART from Walnut Creek station to Oakland City Center/12th Street station (15 miles)*	NA	NA	NA	NA	22	NA	NA
E	***From Hayward***							
	Freeway — *Interstate 880 northbound and I-980 eastbound from Route 92 junction in Hayward to Interstate 580 junction (17 miles)*	19	19	19	23	23	0	+4
	Transit — *BART from Hayward station to Oakland City Center/12th Street station (14 miles)*	NA	NA	NA	NA	23	NA	NA

Sources: Caltrans District 4 and Metropolitan Transportation Commission

Transit travel time not collected prior to 2002
Freeway travel times assume typical travel conditions, with no accidents. Transit travel times assume scheduled times.

Travel Time for Selected Commutes to San Jose (arriving at 8:30 a.m.), 1998 – 2002

		Travel Time in Minutes					Change in Minutes	
		1998	1999	2000	2001	2002	2001–2002	1998–2002
F	***From Dublin/Pleasanton***							
	Freeway — *Interstate 680 southbound from Interstate 580 junction in Dublin to U.S. 101/ Interstate 280 junction in San Jose (29 miles)*	66	61	69	69	42	–27	–24
	Transit — *Altamont Commuter Express (ACE) Pleasanton station to San Jose Diridon station by ACE train (34 miles)*	NA	NA	NA	NA	62	NA	NA
G	***From Gilroy***							
	Freeway — *U.S. 101 northbound from Route 152 junction in Gilroy to Interstate 880 junction (33 miles)*	44	54	59	55	45	–10	+1
	Transit — *Caltrain from Gilroy station to San Jose Diridon station (30 miles)*	NA	NA	NA	NA	52	NA	NA
H	***From San Mateo***							
	Freeway — *U.S. 101 southbound from Route 92 junction in San Mateo to Interstate 880 junction (26 miles)*	41	42	44	43	38	–5	–3
	Transit — *Caltrain from San Mateo station to San Jose Diridon station (30 miles)*	NA	NA	NA	NA	60	NA	NA
I	***From Hayward***							
	Freeway — *Interstate 880 southbound from Route 92 junction in Hayward to U.S. 101 junction (22.8 miles)*	41	53	67	61	63	+2	+22
	Transit — *Amtrak from Hayward station to San Jose Diridon station (28 miles)*	NA	NA	NA	NA	62	NA	NA

Sources: Caltrans District 4 and Metropolitan Transportation Commission

Transit travel time not collected prior to 2002
Freeway travel times assume typical travel conditions, with no accidents. Transit travel times assume scheduled times.

Modest Uptick in Bay Area Traffic Volumes; Bridge Traffic Flat

The economy may have just sputtered along and commute-hour congestion may have been down, but the volume of vehicles on selected stretches of Bay Area freeways nevertheless inched upward in 2002, with four of the seven monitored locations recording volume increases in the low single digits (see map on facing page). At one location on the periphery of the region — Interstate 505 in northern Solano County — the volume of traffic increased by a full 12 percent. On the other side of the ledger, Peninsula traffic actually declined by two percent on U.S. 101 at Millbrae Avenue — in keeping with what has been a prolonged economic slump in this technology-sensitive sector of the region since the bursting of the dot-com bubble at the beginning of the decade.

The modest growth in traffic volumes is testament to the strong travel demand in the region. This underlying trend is easily discerned in the longer-term, 1998–2002 travel volume comparisons for each monitored location, where double-digit increases are the rule.

To monitor the usage of Bay Area freeways, Caltrans maintains fixed traffic count stations that continuously record the number of vehicles that pass by in both directions throughout the year. The traffic counts are expressed in terms of average daily vehicle volumes. It should be noted that an increase in daily traffic volume does not necessarily lead to increased congestion and longer travel times. If, for example, traffic volume on a given freeway segment increases primarily during non-peak hours when there is plenty of unused lane capacity, congestion and travel time would not be affected.

A Closer Look: Bay Area Toll Bridges – Traffic volumes were relatively flat overall on Bay Area bridges in 2002, with low-single-digit growth the rule on most spans. The Golden Gate and Dumbarton bridges actually saw a year-over-year reduction in the number of vehicles crossing in the toll direction. Longer term (1999–2002), the growth in bridge traffic also was more muted than that recorded at freeway sites farther from the region's central core.

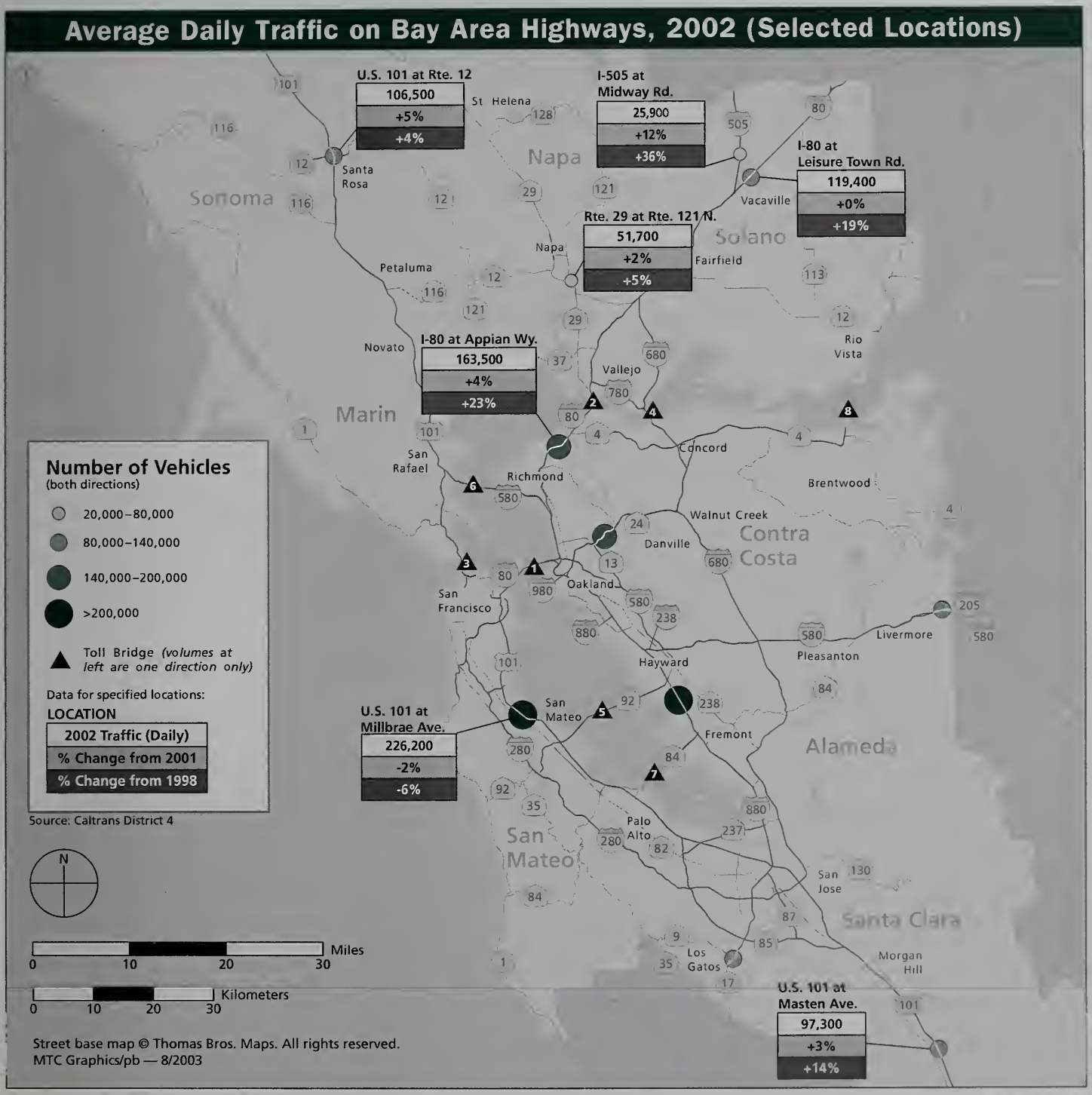
Average Daily Traffic on Bay Area Toll Bridges (toll direction only), 1999–2002

	Number of Vehicles				Percent Change	
Bridge	**1999**	**2000**	**2001**	**2002**	**2001–2002**	**1999–2002**
1 San Francisco–Oakland Bay	135,220	138,181	136,636	136,952	0%	+1%
2 Carquinez	58,139	60,402	62,185	64,111	+3%	+10%
3 Golden Gate	57,586	58,127	56,511	54,920	–3%	–5%
4 Benicia–Martinez	46,892	47,705	49,382	50,797	+3%	+8%
5 San Mateo–Hayward	40,932	42,586	41,153	42,010	+2%	+3%
6 Richmond–San Rafael	32,759	33,968	35,427	35,878	+1%	+10%
7 Dumbarton	31,926	34,226	34,362	33,009	–4%	+3%
8 Antioch	5,267	5,785	6,487	6,897	+6%	+31%
Total All Bridges	**408,721**	**420,575**	**422,142**	**424,575**	**+1%**	**+4%**

Sources: Bay Area Toll Authority; Golden Gate Bridge, Highway and Transportation District

Data for 1998 not available

Average Daily Traffic on Bay Area Highways, 2002 (Selected Locations)



Source: Caltrans District 4

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MTC Graphics/pb — 8/2003

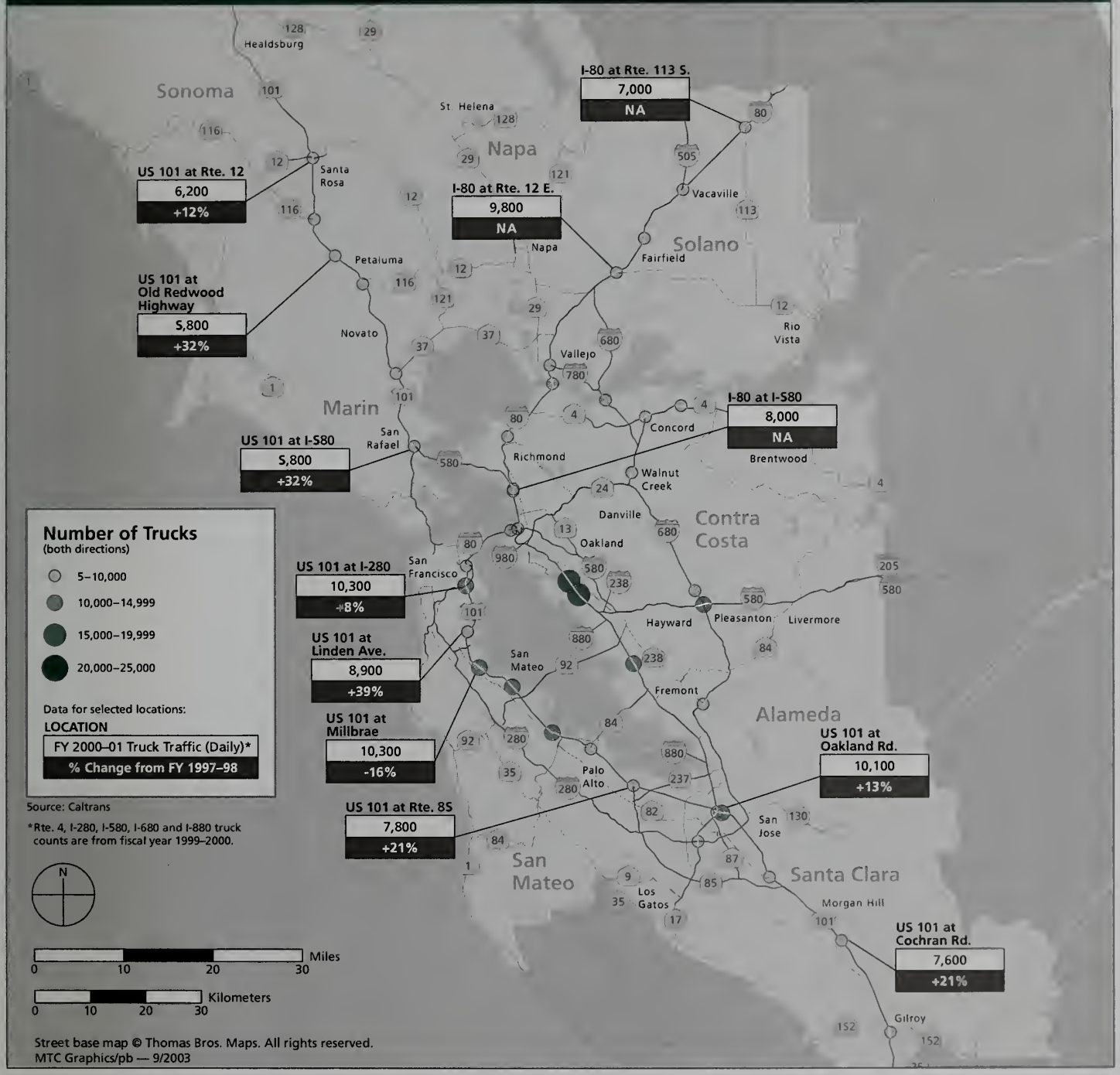
U.S. 101 Sees Growth in Truck Traffic Through Fiscal Year 2000-01; Slowdown Near SFO Is Exception

A survey of truck traffic conducted just after the peak of the last economic boom shows that the volume of trucks traveling on Bay Area portions of U.S. 101 increased markedly during the fiscal years 1997-98 to 2000-01, the most recent period for which truck counts are available. Traffic volumes recorded by Caltrans along this major north-south commercial artery grew by as much as 39 percent in that four-year timeframe. Some of the locations with the largest growth were U.S. 101 at Old Redwood Highway in Petaluma (Sonoma County), U.S. 101 at the Interstate 580 junction in San Rafael (Marin County) and U.S. 101 at Linden Avenue in South San Francisco (San Mateo County). Truck traffic increased from 32 percent to 39 percent at these three locations.

An exception to this record of freight-hauling expansion is the 16 percent drop in truck traffic on U.S. 101 at Millbrae Avenue in Millbrae. The falloff in traffic at this location is likely explained by its proximity to San Francisco International Airport, where air cargo tonnage suffered an 18 percent decline during the similar calendar-year period 1998 to 2001 (see table on page 49). The fall in air cargo tonnage at SFO meant fewer trucks were traveling on U.S. 101 to make drop-offs or pick-ups at the airport's cargo terminals.

Caltrans monitors the volume of truck traffic throughout the Bay Area via a program of continuous sampling on a six-year cycle. All routes are monitored at least every six years, and some are monitored more frequently. In the 2000-01 fiscal year, monitoring was concentrated on U.S. 101 and some locations on Interstate 80. Counts at many locations on U.S. 101 can be compared to fiscal year 1997-98 because that is the next-most-recent year for which U.S. 101 truck traffic data is available. Data for 1997-98 is not available for locations on Interstate 80, so no earlier year comparison is shown. (See page 56 for additional information on the collection of truck traffic data.)

Average Daily Truck Traffic, Fiscal Year 2000-01*



Source: Caltrans

*Rte. 4, I-280, I-580, I-680 and I-880 truck counts are from fiscal year 1999–2000.

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MTC Graphics/pb — 9/2003

Even With Lighter Traffic, Time Savings Afforded by Most Top Carpool Lanes Remains Steady

Bay Area carpoolers continued to realize significant time savings in many diamond-lane segments in 2002, though the benefit realized in two of the three routes with the greatest absolute time savings declined relative to the previous year. At the same time, a newcomer to the region's carpool-lane network – Highway 101 from Wilfred Avenue to Route 12 in Sonoma County – made a strong debut in 2002, offering northbound afternoon carpoolers a 15-minute time savings compared to travel time in the adjacent mixed-flow lanes.

Far and away the best-performing carpool lane, in terms of the number of minutes lopped off the trips of those who use it, is the 11.5-mile stretch of Interstate 880 from Whipple Road to Mission Boulevard in southern Alameda County. Morning commuters traveling southbound can shave a full 40 minutes off their travel time by dou-

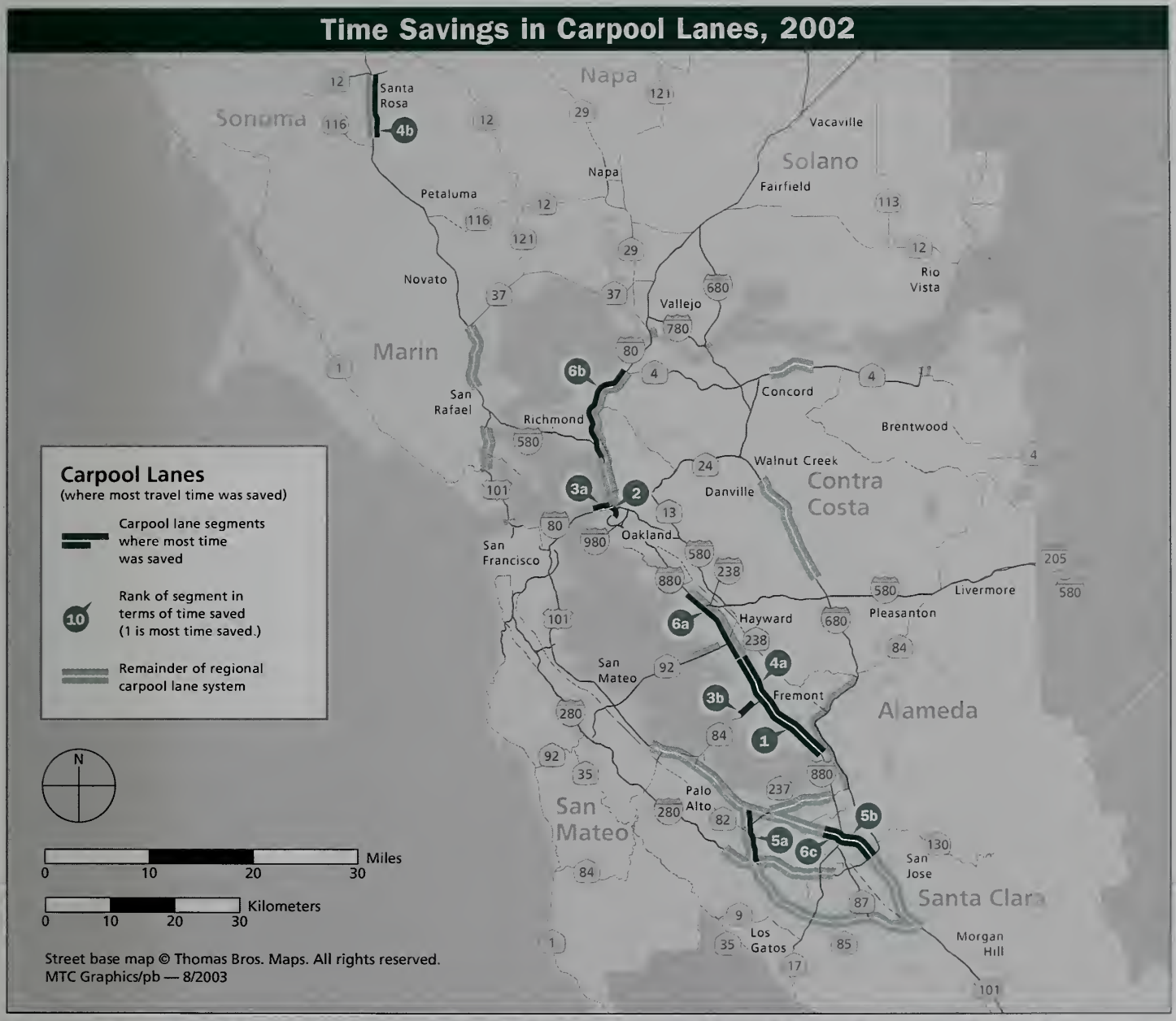
Bay Area Carpool Lanes Where Most Time Was Saved, 1998–2002

		Minutes Saved per Vehicle in Peak Hour					Change in Minutes Saved	
Rank	Carpool Lane	1998	1999	2000	2001	2002	2001–2002	1998–2002
1	**Interstate 880, southbound, a.m.** — Alameda County *Whipple Road to Mission Boulevard (11.5 miles)*	NA	25	25	40	40	0	NA
2	**Interstate 880, northbound, a.m.** — Alameda County *16th Street to Bay Bridge toll plaza (1.2 miles)*	9	18	32	31	23	–8	+14
3a	**Interstate 80, westbound, a.m.**[1] — Alameda County *Bay Bridge toll plaza (4 lanes, 0.4 to 1 mile)*	15	18	24	24	19	–5	+4
3b	**Route 84, westbound, a.m.** — Alameda County *Dumbarton Bridge toll plaza (1.8 miles)*	16	16	16	19	19	0	+3
4a	**Interstate 880, northbound, p.m.** — Alameda County *Mission Boulevard to Whipple Road (11.5 miles)*	NA	9	9	15	15	0	NA
4b	**U.S. 101, northbound, p.m.** — Sonoma County *Wilfred Avenue to Route 12 (5 miles)*	NA	NA	NA	NA	15	NA	NA
5a	**Route 85, northbound, a.m.** — Santa Clara County *Interstate 280 to U.S. 101 (3.5 miles)*	12	8	13	12	13	+1	+1
5b	**U.S. 101, northbound, a.m.** — Santa Clara County *I-280/I-680 to Guadalupe Parkway (6 miles)*	7	11	16	13	13	0	+6
6a	**Interstate 880, southbound, a.m.** — Alameda County *Marina Boulevard to Whipple Road (8.8 miles)*	9	14	14	12	12	0	+3
6b	**Interstate 80, westbound, a.m.** — Contra Costa County *Route 4 to Alameda County line (9.7 miles)*	10	11	11	13	12	–1	+2
6c	**U.S. 101, southbound, p.m.** — Santa Clara County *Gaudalupe Parkway to I-280/I-680 interchange (6 miles)*	4	4	5	12	12	0	+8

Source: Caltrans District 4

[1]Carpool is three or more persons per vehicle. For all other listed locations, carpool is two or more persons.

NA = Not available



bling up with another rider. While this time savings held steady at the year-earlier level, the next two most time-efficient carpool lanes — the I-880 and I-80 morning approaches to the Bay Bridge toll plaza — offered smaller time benefits to carpoolers in 2002 compared to 2001. In the case of I-80, this was due to crowding in the carpool lane; in the I-880 segment, reduced congestion led to increased speeds in the mixed-flow lanes, thus decreasing the time savings offered by the carpool lane.

Reduced Congestion Diminishes Use of Carpool Lanes in 2002

The Bay Area's most popular carpool lanes saw fewer commuters in 2002, as improved traffic conditions in mixed-flow lanes caused some workers to revert to driving alone. Six of the 10 carpool lanes with the highest peak-hour usage saw patronage decline, with the drop-offs ranging from 1 percent to 9 percent. But on stretches of Interstates 80 and 880 in Alameda County and U.S. 101 in Santa Clara County, carpooling grew in favor over the last year, continuing a long-term trend that has led to big percentage increases in usage over the 1998–2002 time period for these lanes — and for 8 of the 10 lanes on the list.

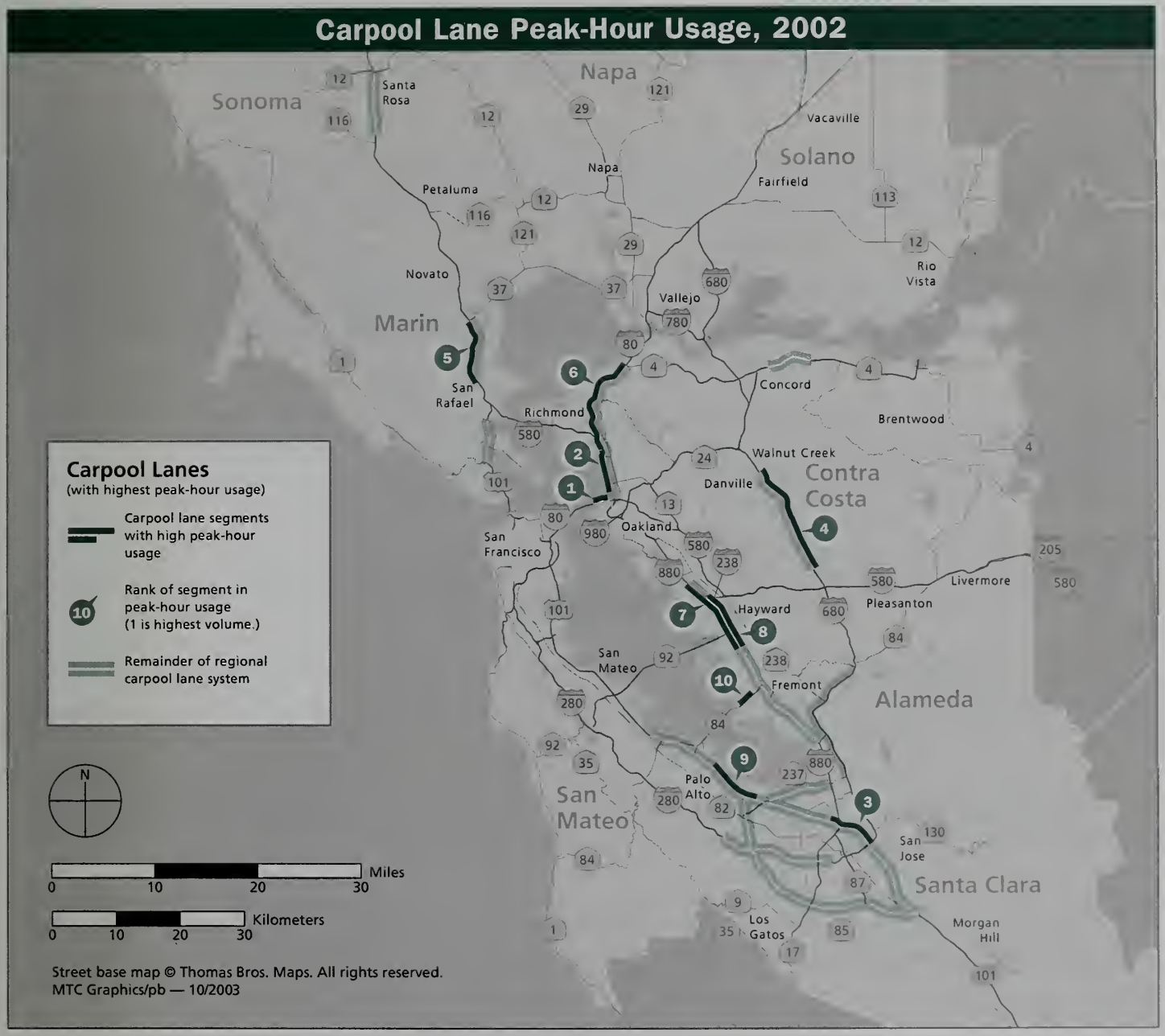
Even after a 6 percent decline in usage in 2002, the carpool lane on Interstate 80 leading to the toll plaza at the San Francisco-Oakland Bay Bridge is far and away the most heavily utilized lane in the region — even with the 3-persons-per-vehicle minimum needed to qualify as a carpool. Farther upstream on westbound I-80, usage actually grew 9 percent last year from the Contra Costa County line to the Powell Street exit in Emeryville, moving this segment into second place on the list of carpool lanes with highest

Bay Area Carpool Lanes With Highest Peak-Hour Usage, 1998–2002

		Peak-Hour Carpool Vehicles[1]					Percent Change	
Rank	Carpool Lane	1998	1999	2000	2001	2002	2001–2002	1998–2002
1	**Interstate 80, westbound, a.m.** — Alameda County *Bay Bridge toll plaza*	3,083	3,492	3,804	3,975	3,730	–6%	+21%
2	**Interstate 80, westbound, a.m.** — Alameda County *Contra Costa County line to Powell Street*	1,365	1,503	1,113	1,555	1,698	+9%	+24%
3	**U.S. 101, northbound, a.m.** — Santa Clara County *I-280/I-680 interchange to Guadalupe Parkway*	1,672	1,692	1,585	1,594	1,490	–7%	–11%
4	**Interstate 680, northbound, p.m.** — Contra Costa Co. *Alcosta Boulevard to Livorna Road*	1,043	1,119	1,421	1,383	1,374	–1%	+32%
5	**U.S. 101, southbound, a.m.** — Marin County *Route 37 to North San Pedro Road*	1,103	1,217	1,282	1,361	1,361	0%	+23%
6	**Interstate 80, westbound, a.m.** — Contra Costa County *Route 4 to Alameda County line*	1,062	1,146	1,428	1,317	1,285	–2%	+21%
7	**Interstate 880, southbound, p.m.** — Alameda County *Marina Boulevard to Whipple Road*	738	745	748	996	1,280	+29%	+73%
8	**Interstate 880, northbound, p.m.** — Alameda County *Whipple Road to south of Interstate 238 interchange*	788	867	1,364	1,338	1,264	–6%	+60%
9	**U.S. 101, northbound, p.m.** — Santa Clara County *Ellis Street to San Mateo County line*	798	911	933	1,064	1,249	+17%	+57%
10	**Route 84, westbound, a.m.** — Alameda County *Dumbarton Bridge toll plaza*	1,453	1,626	1,376	1,354	1,229	–9%	–15%

Source: Caltrans District 4

[1]Includes buses, vanpools and motorcycles



peak-hour usage. Overall, on the Bay Area freeway segments equipped with them, carpool lanes carried 15 percent of peak-hour vehicles, but moved 28 percent of the people traveling on those freeways. The peak-hour average speed in carpool lanes during 2002 was 62 miles per hour, versus 41 miles per hour in mixed-flow lanes.

Fewer Uncongested Roads in Alameda and Santa Clara Counties in 2002

The only Bay Area counties to monitor congestion on local roadways in 2002 were Alameda and Santa Clara, and both counties found an increase in the portion of roads experiencing "moderately congested" conditions during the afternoon commute period. With 2000 as a comparison year, the percentage of "moderately congested" roadways in Santa Clara County rose to 54 percent from 47 percent, and in Alameda County to 29 percent from 25 percent. In Santa Clara County, however, where the traffic-thinning effects of the dot-com implosion were still being felt, the portion of roadways categorized as "severely congested" shrank by almost half from the level measured in 2000, falling to 6 percent from 10 percent. The portion of "severely congested" roadways in Alameda County remained steady, at 2 percent.

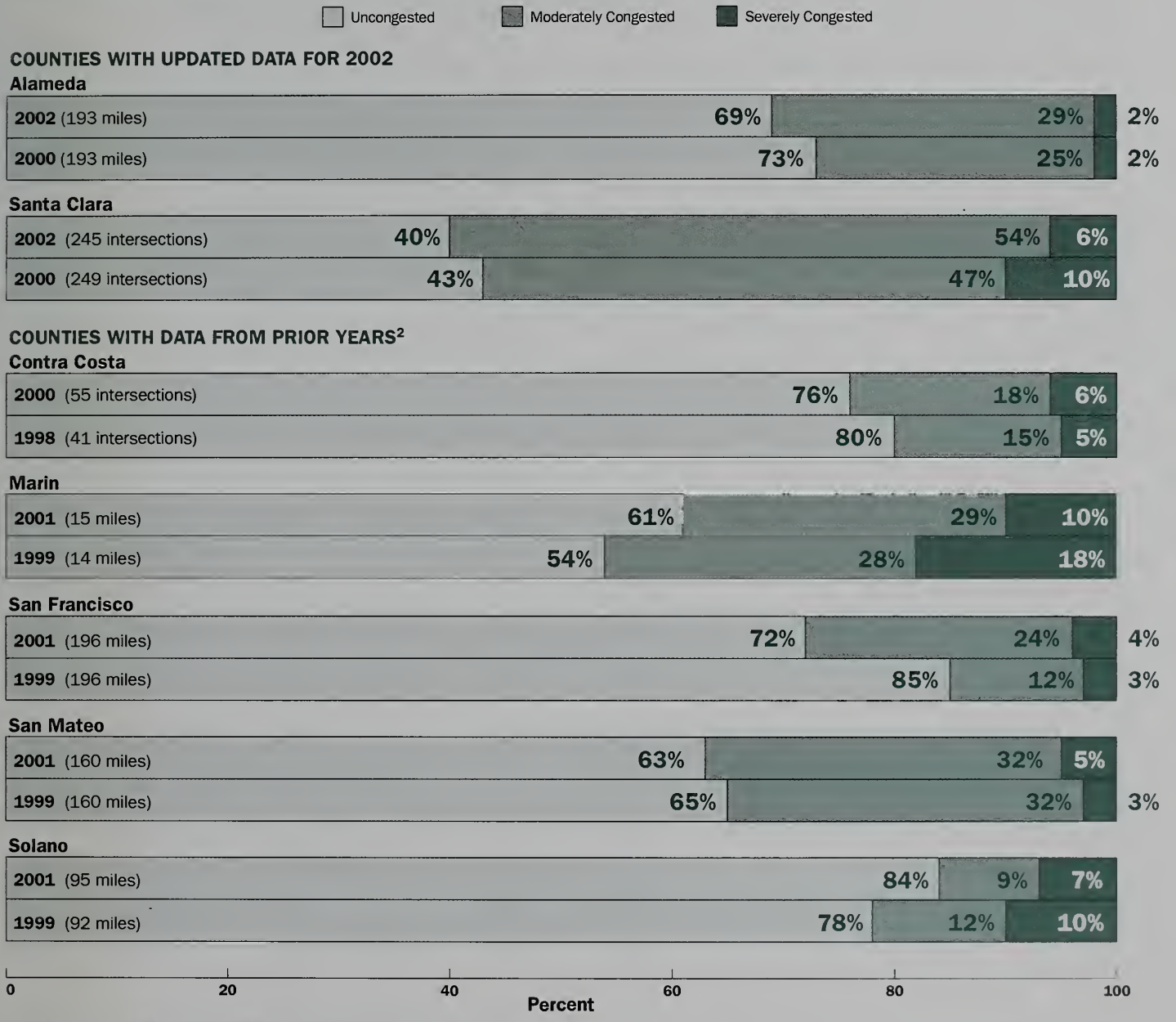
In those Bay Area counties that did not monitor local congestion in 2002, prior-year data show a lightening of afternoon congestion in both Marin and Solano counties, where the percentage of "uncongested" roadways rose to 61 percent in Marin and 84 percent in Solano in 2001 (from 54 percent and 78 percent, respectively, in 1999). In the case of Marin, virtually all the increase in uncongested roadways came from a decrease in the percentage of severely congested roadways, which dropped to 10 percent in 2001 from 18 percent in 1999. San Francisco, meanwhile, witnessed an opposite occurrence, with the percentage of uncongested roadways declining to 72 percent in 2001 from 85 percent two years earlier. This boosted the moderately congested portion of the city's roadways to 24 percent in 2001 from 12 percent in 1999. In Contra Costa and San Mateo counties, afternoon traffic conditions changed little in the years most recently monitored.

However, even though congestion has increased in some counties, it should be noted that in most of the monitored segments and intersections in the local roadway system, traffic still flows freely during the evening commute period. Santa Clara County is an exception to this phenomenon. Here, even though the slowing economy has reduced the percentage of severely congested intersections, a majority — 60 percent — of the 245 intersections monitored by the county's congestion management agency in 2002 continue to experience moderate or severe congestion during the afternoon peak period.

In the Bay Area, congestion management agencies monitor performance of a selected system of "high priority" local roads biennially in every county except Napa and Sonoma. Santa Clara and Contra Costa counties measure congestion based on vehicle counts at major intersections. San Francisco, Alameda and Marin counties measure congestion on roadway segments either by counting vehicles or by using specially equipped cars that cruise selected segments of the roadway system to calculate the average travel speed. San Mateo and Solano counties use both the intersection and roadway segment techniques, but only the results of the segment monitoring are reported here, because these account for a greater portion of those counties' roadway systems.

Because monitoring techniques vary by county, the congestion data presented here is best used to track changes within a given county over time (rather than to compare conditions in different counties). See Appendix A for further discussion of monitoring techniques and definitions of congestion severity.

Local Roadway Congestion by County[1] During the P.M. Peak Commute Period



Source: County congestion monitoring reports

[1] Selected road segments and/or intersections; Napa and Sonoma counties do not monitor local roadway congestion.
[2] Current (2002) data is not available for Contra Costa, Marin, San Francisco, San Mateo or Solano counties.

Transit Operators Improve Punctuality Record in 2001-02

Riders of the Bay Area's buses and trains were able to plan their trips with greater certainty in 2001-02, thanks to improved on-time performance records posted by the region's seven largest transit operators. Setting the standard for punctuality was Caltrain, which compiled an impressive 96 percent on-time record, a significant improvement over 2000-01, when 86 percent of the Peninsula railroad's trains met the railroad's internal performance standard of arriving at stations within 5 minutes of scheduled times. Valley Transportation Authority (VTA) buses and BART trains continued their consistently strong records of punctuality, logging on-time performance ratings of 95 percent and 93 percent, respectively. Also noteworthy was the performance of San Francisco Muni, which recorded strong on-time improvements across its fleet of light-rail vehicles, motor buses and electric trolley buses.

It should be noted that Caltrain's improved on-time record is traceable in part to schedule adjustments made by the railroad to reflect slower travel speeds due to track construction work. Calibrating schedules to match performance naturally tends to boost an agency's record of on-time performance in the short run. Still, it is considered good man-

On-Time Performance of Seven Largest Bay Area Transit Operators, Fiscal Years 1997-98–2001-02

	Percent of Trips on Time by Fiscal Year					
	1997-98	1998-99	1999-2000	2000-01	2001-02	2001-02 Goal
Buses						
Valley Transportation Authority[1]	94%	94%	94%	93%	95%	95%
Golden Gate Transit[2]	91%	88%	87%	85%	87%	90%
SamTrans[3]	88%	85%	85%	85%	84%	85%
AC Transit[4]	70%	73%	73%	69%	74%	90%
Muni (electric trolley bus)[5]	54%	54%	NA	64%	74%	85%
Muni (motor bus)[5]	50%	57%	NA	63%	68%	85%
Rail						
Caltrain[6]	94%	88%	66%	86%	96%	95%
BART[7]	92%	92%	92%	92%	93%	95%
VTA[8]	91%	91%	91%	93%	84%	95%
Muni[5]	26%	43%	NA	49%	66%	85%

Sources: AC Transit, Golden Gate Transit, Muni, SamTrans, VTA, Caltrain, BART

Notes:

[1] No more than 5 minutes late
[2] Less than 5 minutes late and 1 minute early (bus only); prior to 2001-02, no more than 5 minutes late.
[3] No more than 5 minutes late; prior to 2001-02, no more than 5 minutes late or 1 minute early
[4] Never early and no more than 5 minutes late
[5] No more than 4 minutes late or 1 minute early; prior to 1998-99, no more than 3 minutes late or 1 minute early
[6] Train arrived at the end of the station within 5 minutes of scheduled time
[7] Less than 5 minutes late at scheduled terminal stations
[8] No more than 3 minutes late

agement practice for transit operators to update their schedules periodically to reflect changing traffic conditions and other factors beyond their control that nevertheless affect their ability to adhere to published timetables. Of course, changing conditions can sometimes work to enhance transit operators' ability to stick to a schedule. A case in point is the recent reduction in congestion on local roadways in the region (a consequence of the sluggish economy); here the freer flow of traffic likely helped bus operators to improve their record of on-schedule service in 2001-02.

The impressive gains in Muni's performance reflect continued efforts to improve service in response to 1999's voter-approved Proposition E. Proposition E also liberalized the definition of "on-time," though Muni's standard is still the most rigorous of the major operators — and one of the most difficult standards to meet.

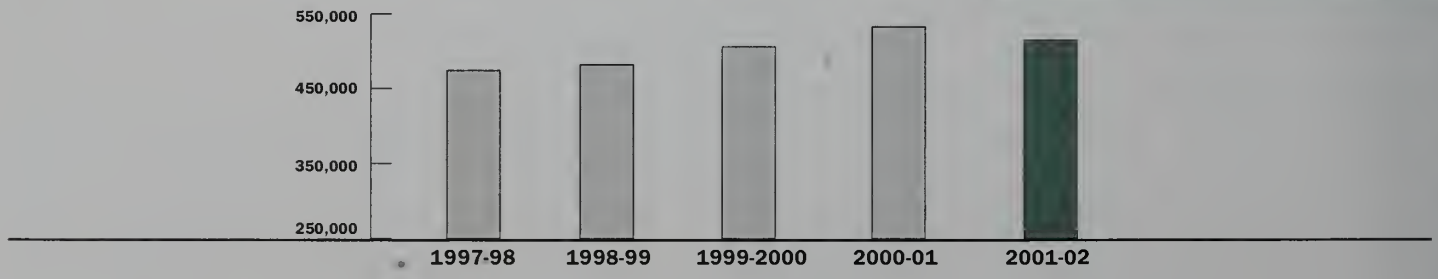
Slowing Economy Puts the Brakes on Rising Transit Ridership; 2001-02 Sees First Drop in Five Years

After rising a healthy 12 percent during the economic boom years between 1997-98 and 2000-01, transit ridership slipped back a notch in 2001-02, falling 3 percent from the record high level achieved a year earlier. The decline was expected, given the loss of hundreds of thousands of jobs in the region due to the bursting of the dot-com bubble and the general economic slowdown the Bay Area has experienced. Still, even with 15 million fewer annual boardings, ridership remained above the 500 million mark and is up 9 percent from the 1997-98 level.

The seven largest transit operators in the Bay Area all suffered ridership declines in 2001-02, ranging from a scant 1 percent dropoff for San Francisco Muni to a stiff 18 percent decline for the Peninsula's Caltrain. In the latter case, part of the falloff in ridership was due to Caltrain's suspension of weekend rail operations (substituting instead temporary bus service) to construct track improvements for its new Baby Bullet express service. Ridership at BART fell by 7 percent during the year, and its 6.8 million fewer boardings accounted for almost half the regional decline. The four

Ridership on Bay Area Transit Systems by Operator, Fiscal Years 1997-98–2001-02

	Thousands of Annual Boardings					Percent Change	
Operator	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-01–2001-02	1997-98–2001-02
Muni	219,507	217,050	226,182	236,205	234,303	–1%	+7%
BART	81,422	86,488	97,024	103,919	97,351	–6%	+20%
AC Transit	63,877	66,089	68,088	71,529	69,531	–3%	+9%
Valley Transportation Authority	53,547	54,996	55,701	58,160	53,710	–8%	0%
SamTrans	18,834	18,350	17,925	18,136	17,387	–4%	–8%
Golden Gate Transit	11,032	11,108	11,465	11,618	10,676	–8%	–3%
Caltrain	8,632	8,622	8,735	9,925	8,138	–18%	–6%
Other Operators	17,349	19,282	20,986	23,546	23,863	+1%	+38%
Total – All Operators	**474,200**	**481,986**	**506,106**	**533,038**	**514,958**	**–3%**	**+9%**



Source: Metropolitan Transportation Commission and Federal Transit Administration

largest operators — San Francisco Muni, BART, AC Transit and the Valley Transportation Authority — still carry the overwhelming majority of riders. Together these four operators carried 89 percent of all riders in 2001-02, the same percentage as the previous year.

On a brighter note, the smaller transit operators who provide service to communities outside the main urban core saw their ridership rise in 2001-02 by a collective 4 percent, indicating that demand for transit in these areas is still on the rise.

A Closer Look –

The 10 most heavily used Bay Area bus routes in fiscal year 2001–02 are shown to the right. Eight of the routes are operated by San Francisco Muni.

Top 10 Bay Area Bus Routes, by Boardings

Rank	Route	Average Weekday Boardings 2001-02	2000-01 Rank
1.	San Francisco Muni: 38 Geary	53,400	1
2.	San Francisco Muni: 14 Mission	45,400	2
3.	San Francisco Muni: 1 California	30,600	3
4.	San Francisco Muni: 9 San Bruno	29,900	4
5.	San Francisco Muni: 49 Van Ness/Mission	28,900	10
6.	San Francisco Muni: 30 Stockton	28,300	6
7.	San Francisco Muni: 15 Third St.	26,500	5
8.	Valley Transportation Authority: 22 Eastridge – Palo Alto/Menlo Park	24,100	8
9.	AC Transit: 82/82L West Oakland – Hayward BART	22,500	9
10.	San Francisco Muni: 22 Fillmore	22,000	7

Sources: AC Transit, Muni, VTA

Note: AC Transit data is for 1998, the latest year available.

Safety

One of the goals of the *2001 Regional Transportation Plan* is to improve safety for all users of the transportation system — drivers and passengers, transit users, bicyclists and pedestrians.

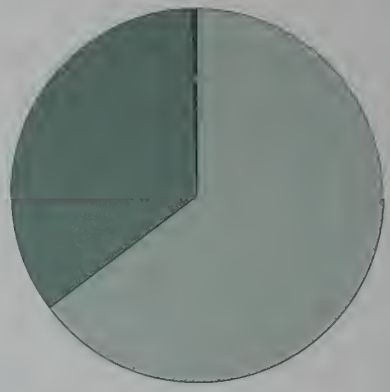
This report uses statistics on injuries and fatalities resulting from collisions to gauge safety. The most widely used safety information on automobile collisions with other cars, bicyclists and pedestrians comes from data assembled by the California Highway Patrol. Transit operators report injuries and fatalities occurring on their systems to the Federal Transit Administration.

Slight Rise in Collisions in 2002; Slight Drop in Those Involving Injuries or Fatalities

The bad news is that the total number of motor vehicle collisions in the Bay Area rose in 2002, to 106,530 (from 103,990 the year before). The good news is that the entire net increase was accounted for by collisions resulting in property damage only, which as a group comprise almost two-thirds (64.7 percent) of all motor vehicle collisions (see pie chart). Collisions involving either injuries or fatalities were down by 3 percent in 2002, the second straight annual decline in this key measure of transportation safety. The number of injury-and-fatality collisions is at its lowest point in the last five years.

Several factors influence the number of injury and fatal collisions in the Bay Area: driver education and behavior, vehicle safety features, roadway conditions, and, of course, the number of miles driven (on both freeways and local roadways). With respect to this last point, studies show that although freeway driving accounts for

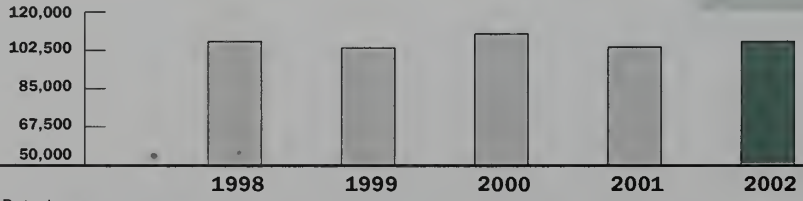
Motor Vehicle Collisions in the Bay Area In 2002: Fatal, Injury, Property Damage



Source: California Highway Patrol
106,530 collisions = 100%

Injury and Fatal Collisions on Bay Area Roadways, 1998–2002

	Collisions					Percent Change	
	1998	1999	2000	2001	2002	2001–2002	1998–2002
Injury Collisions	39,027	37,913	39,609	38,322	37,167	–3%	–5%
Fatal Collisions	433	405	444	449	451	0%	+4%
Total Injury and Fatal Collisions	**39,460**	**38,318**	**40,053**	**38,771**	**37,618**	**–3%**	**–5%**
Property Damage Only Collisions	67,164	65,339	70,001	65,219	68,912	+6%	+3%
Total Collisions	**106,624**	**103,657**	**110,054**	**103,990**	**106,530**	**+2%**	**0%**



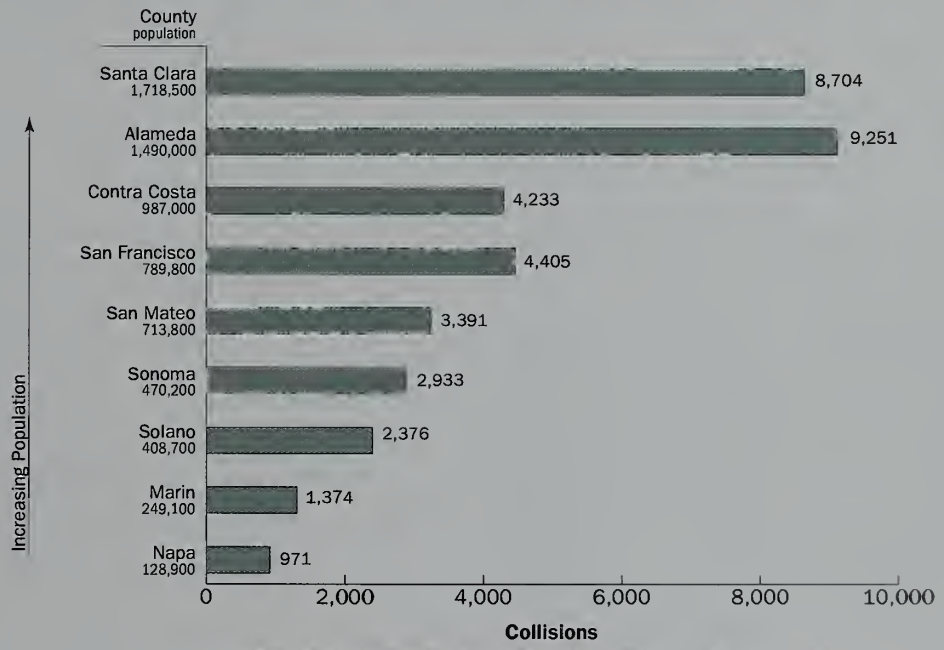
Source: California Highway Patrol (see note on page 57)

approximately 60 percent of all vehicle miles driven in the Bay Area, only about one-quarter of all collisions occur on freeways.

In 2002, 37,618 motor vehicle collisions resulted in injuries or fatalities on Bay Area roads and freeways. (Motor vehicle refers to all motorized conveyances that use the roads — private automobiles, commercial trucks, buses, motorcycles, etc.) As can be seen in the table on page 32, the number of injury and fatal collisions fluctuated within a fairly narrow range from year to year during the recent five-year period from 1998 to 2002. The same holds true for the individual components of the measure — injury collisions and fatal collisions. It is therefore difficult to determine whether changes in the data indicate a trend (as might appear to be the case in the two-year decline in injury and fatal collisions), or whether they are merely normal variations in a relatively stable phenomenon.

A Closer Look – We can get a rough idea of the geographical distribution of the injury and fatal collisions that occurred in 2002 by breaking them out by county of occurrence. In general, a given county's share of collisions correlates closely with its size, as measured by population (see bar graph). Alameda County and San Francisco both exhibit a collision rate higher than their population rank. This may be due to their status as "crossroads" counties, where a significant portion of travel is by residents of other areas.

Injury and Fatal Collisions by Bay Area County, 2002



Sources: California Highway Patrol (see note on page 57); California Department of Finance

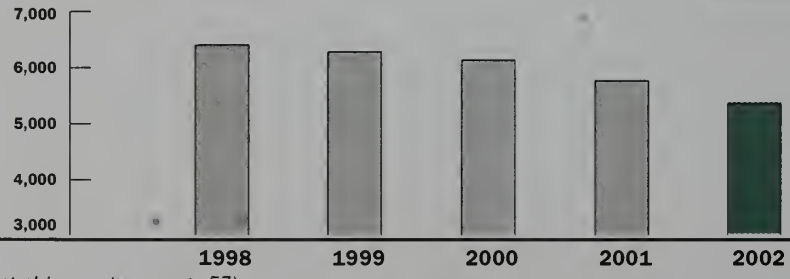
Collisions Involving Pedestrians and Cyclists Decline in 2002, Continuing Recent Downward Trend

Although increasing attention is being paid to the dangers faced by pedestrians and bicyclists on Bay Area roadways, data collected by the California Highway Patrol shows a downward trend in the number of motor vehicle collisions that involve injury or fatality to these two groups of travelers over the past five years. In 2002, 5,361 pedestrians and cyclists were injured or killed in collisions with motor vehicles. That is 408 fewer people than were similarly affected in 2001, a 7 percent decrease (see table below). Since 1998, the number of walkers and cyclists involved in injury or fatality collisions has dropped by more than 1,000, or 16 percent.

While this is encouraging news, the absolute numbers involved are rather small, and year-to-year fluctuations — or even a five-year trend — can be magnified when viewed in percentage terms. It also should be noted that the statistics presented here include only motor vehicle collisions that are reported to law enforcement authorities. Collisions involving pedestrians and bicyclists that are not reported could be significant in number and would make these totals higher. Based only on these statistics, then, it might be premature to conclude that the Bay Area is becoming a safer place for pedestrians and cyclists. But the downward trend gives reason for optimism.

Injury and Fatality Motor Vehicle Collisions Involving Pedestrians or Bicyclists, 1998–2002

	Collisions					Percent Change	
	1998	1999	2000	2001	2002	2001–2002	1998–2002
Collisions Involving Pedestrians							
Injury Collisions	3,258	3,099	3,173	3,080	2,910	–6%	–11%
Fatal Collisions	125	97	134	103	111	+8%	–11%
Subtotal	3,383	3,196	3,307	3,183	3,021	–5%	–11%
Collisions Involving Bicyclists							
Injury Collisions	3,004	3,066	2,810	2,566	2,321	–10%	–23%
Fatal Collisions	18	19	17	20	19	–5%	+6%
Subtotal	3,022	3,085	2,827	2,586	2,340	–10%	–23%
Total Involving Bicyclists or Pedestrians	**6,405**	**6,281**	**6,134**	**5,769**	**5,361**	**–7%**	**–16%**



Source: California Highway Patrol (see note on page 57)

The 5,361 collisions involving pedestrians and cyclists comprised 14 percent of the 37,618 injury-and-fatality motor vehicle collisions in the Bay Area in 2002 (see page 32).

A Closer Look – Areas where lots of people walk or bike are likely to have greater numbers of collisions involving pedestrians and bicyclists. In the absence of better data on the amount of bicycling and walking in the Bay Area, we can look for patterns based on population by jurisdiction. In the tables at right, we see a generally strong correlation between population rank and rank in pedestrian- or bicycle-related collisions — with some notable exceptions. Berkeley, which ranks 14th in population, ranks 4th in the number of collisions involving pedestrians and 3rd in those involving bicyclists. This comports with the relatively higher level of walking and biking in this university-centered, environmentally aware community. Meanwhile, Palo Alto, Mountain View and unincorporated Marin County all rank higher in the number of bicycle-involved collisions than they do in population. The presence in Palo Alto of thousands of bike-riding Stanford University students, and the popularity of Marin County as a recreational bicycling destination may help to account for the statistics in those locations, but the explanation for Mountain View's inclusion in this list is less clear. (For a complete list of pedestrian- and bicyclist-involved collisions by jurisdiction, see Appendix C on page 67.)

Injury and Fatal Motor Vehicle Collisions Involving Pedestrians And Bicyclists by Bay Area Jurisdiction, 2002

PEDESTRIANS

2002 Rank	Jurisdiction	Total 2002	Annual Average 1998–2002	Rank in Population
1	San Francisco	877	934	2
2	Oakland	317	295	3
3	San Jose	280	361	1
4	Berkeley	127	113	14
5	Hayward	75	78	8
6	Fremont	63	68	4
7	Richmond	62	54	17
8	Santa Rosa	56	57	6
9	Vallejo	51	48	12
10	Daly City	47	39	13

BICYCLISTS

2002 Rank	Jurisdiction	Total 2002	Annual Average 1998–2002	Rank in Population
1	San Francisco	309	379	2
2	San Jose	265	328	1
3	Berkeley	130	143	14
4	Oakland	130	167	3
5	Fremont	66	165	4
	Palo Alto	66	78	34
7	Santa Rosa	63	83	6
8	Hayward	50	58	8
9	Unincorporated Alameda	47	38	9
10	Mountain View	43	50	27
	Unincorporated Marin	43	36	28

Sources: California Highway Patrol (see note on page 57); U.S. Census Bureau

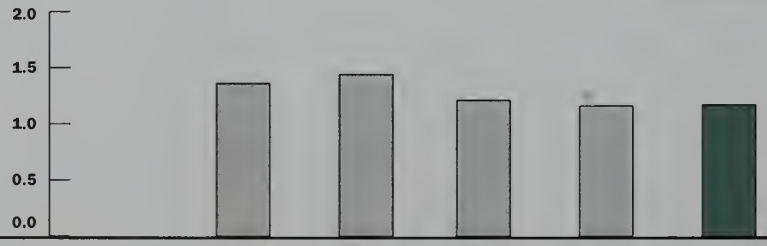
Positive Trend in Transit Safety Through 2000-01

In 2002, the Federal Transit Administration (FTA) shifted to a new reporting system that requires transit operators to submit more frequent and more comprehensive reports for transit safety and security incidents. While the new requirements promise ultimately to improve the quality of information, the safety and security statistics collected by FTA during the transition period appear to be incomplete. As a result, data on transit-related injuries and fatalities for fiscal year 2001-02 have not been included in this report. Instead, data for fiscal years 1996-97 through 2000-01 are presented here, taken from the 2002 State of the System Report. *The discussion that follows also is reprinted from last year's report.*

The number of injuries or fatalities involving transit vehicles in the Bay Area fluctuated within a narrow range over the most recent five-year period, even as the number of miles traveled on transit rose steadily. The result was a noticeable improvement in the per-mile safety record of Bay Area transit operators in the fiscal year 1996-97 to 2000-01 time frame covered by this report (see table and graph below). This trend has held steady over the last couple of years, despite a slight increase in the total number of injury-or-fatality incidents. In 2000-01, for instance, the

Rate of Injuries and Fatalities on Bay Area Transit, Fiscal Years 1996-97–2000-01

						Percent Change	
	1996-97	1997-98	1998-99	1999-2000	2000-01	FY 1999-2000–2000-01	FY 1996-1997–2000-01
Injuries	3,164	3,455	3,014	3,057	3,240	+6%	+2%
Fatalities	15	20	21	31	33	+6%	+120%
Total Injuries and Fatalities	**3,179**	**3,475**	**3,035**	**3,088**	**3,273**	**+6%**	**+3%**
Passenger Miles (Millions)	2,331	2,416	2,509	2,670	2,807	+5%	+20%
Rate of Injuries and Fatalities Per Million Passenger Miles	**1.36**	**1.44**	**1.21**	**1.16**	**1.17**	**+1%**	**–14%**



Source: Federal Transit Administration

number of injuries and fatalities increased by 185, or 6 percent. But because the total number of miles traveled by passengers also increased (by 5 percent) the rate of injuries and fatalities increased only minimally (to 1.17 injuries/fatalities per million passenger miles, up from 1.16 in fiscal year 1999-2000).

However, the increasing number of fatalities involving Bay Area transit vehicles stands out in sharp relief (although the numbers are relatively small considering the size of the regional transit system). Included in this category are deaths on rail tracks judged to be suicides, and there have been a number of these incidents in the Bay Area in recent years.

The statistics reported in this section reflect injuries and fatalities resulting from a wide range of safety incidents — from people who slip and fall while boarding a bus to those injured or killed in collisions with transit vehicles. Included in the statistics are incidents involving transit passengers, employees and others.

State of Repair

The state of repair of freeways, local roadways and transit affects travelers in two respects. The more obvious impact is on the quality of travel. The second impact relates to cost: Letting roadways and transit vehicles fall into disrepair often ends up costing more than it would have cost to perform routine maintenance, just as deferring maintenance on a house often results in a more expensive repair.

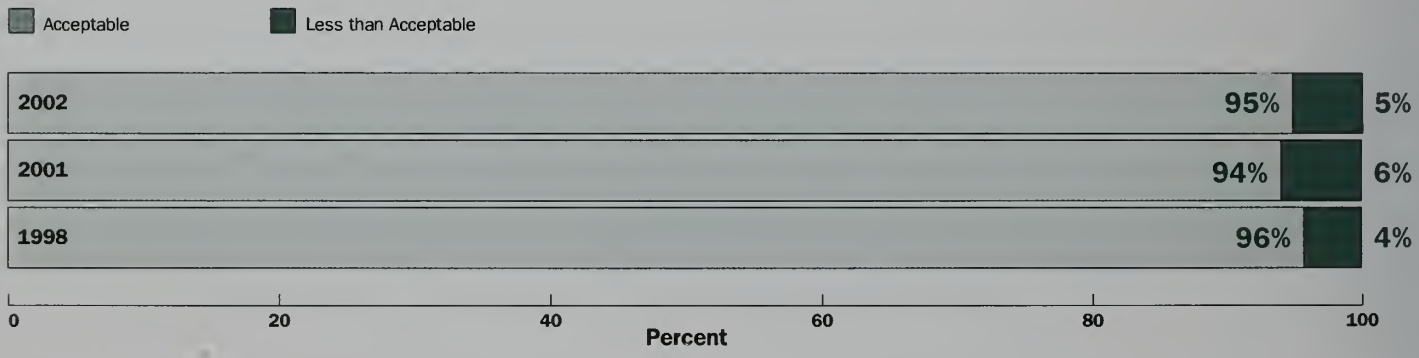
For freeways and local roadways, pavement condition is used as an indication of the state of repair. The condition of the transit system is measured by the number of times service is interrupted for repairs to vehicles or other systems such as tracks or power supply; these unscheduled repairs are known as service calls.

Traffic Aside, Smooth Conditions Prevail on Bay Area Freeway Pavement

Heavy use of Bay Area freeways has a clear and immediate consequence in the form of increased congestion. One less obvious, somewhat longer-term consequence of heavy freeway use is increased wear and tear on the pavement surfaces themselves. Pavement conditions also are affected by weather, construction materials, maintenance history and age.

As the agency responsible for maintaining freeways and state highways in the region, Caltrans keeps close watch on what drivers experience when the rubber literally hits the road on Bay Area freeways. In its latest measurement, Caltrans found the ride quality on Bay Area freeways in 2002 to be acceptable (or better) on the vast majority (95 percent) of Bay Area freeway miles. This

Freeway Pavement Conditions (Ride Quality), 1998, 2001 and 2002



Source: Caltrans District 4

Data for 1999 and 2000 not available
Assessments based on the International Roughness Index

reading is remarkably consistent with other recent measurements of pavement conditions, as can be seen in the bar graph on page 40.

To assess freeway pavement condition, Caltrans deploys roving vehicles equipped with special devices that measure vibrations caused by the road surface. The difference between the vibrations measured on a given stretch of road and the level of vibration that would be experienced on an "ideal" or smooth road is expressed numerically using the International Roughness Index. (See note on page 57 for further discussion of International Roughness Index.)

In addition to measuring the condition of Bay Area freeways in terms of ride quality, Caltrans also monitors the actual physical condition of the pavement by observing and noting pavement distresses (e.g., cracking, etc.). Pavements with significant distresses can sometimes still provide acceptable ride quality, but over time the ride quality can be expected to decline if roadway surfaces are not adequately monitored and repaired as needed. State law requires Caltrans to develop a 10-year plan for rehabilitation and reconstruction of all state highways. The plan must be updated every two years, and is due to be updated at the end of 2003.

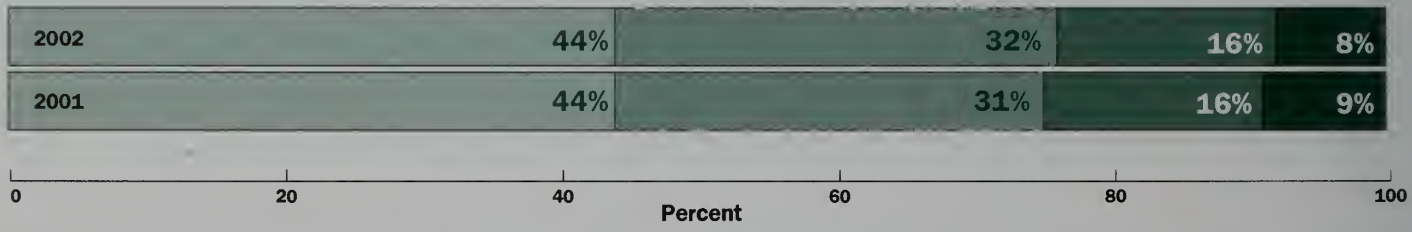
Bay Area Roads in "Good" Shape, But Significant Investments Lie Ahead to Avoid Pavement Deterioration

On average, the 19,000 miles of local streets and roads in the Bay Area were in much the same condition at the end of 2002 as they had been a year earlier. Measured against a "pavement condition index" (PCI) used by MTC's Pavement Management System, the region's local roadways scored a 65 out of a possible 100, a point lower than the average of 66 recorded in 2001. Of course, considering that roads have a lifespan of 25 to 40 years, year-to-year changes in pavement conditions — especially when averaged over such a large roadway network — tend not to be dramatic. And because it is an average, the region's PCI score masks a considerable amount of variation in pavement conditions on individual roads and from jurisdiction to jurisdiction.

Of all local roads, 44 percent were found to be in very good or excellent condition with only minor or no distresses (see bar chart). Such roads require preventive maintenance only. Pavements in good or fair condition — 32 percent of local road mileage, up a percentage point from 2001 — require some rehabilitation but are still drivable. The 16 percent of local roadways found to be in poor or very poor condition are in need of extensive rehabilitation or reconstruction. Pavements in this category may be difficult to drive on and may be riddled with potholes.

In contrast to the direct measure of ride quality used by Caltrans to assess freeway pavement condition (see pages 40-41), the MTC Pavement Management System used

Pavement Conditions for Local Roadways, 2001 and 2002 (total pavement miles)



- **Excellent (PCI = 90–100) or Very Good (PCI = 75–89)** Pavements that have no distress and require mostly preventive maintenance
- **Good (PCI = 60–74) or Fair (PCI = 45–59)** Pavements in this middle range offer acceptable ride quality, though road surfaces are becoming worn to the point where rehabilitation is needed to prevent rapid deterioration.
- **Poor (PCI = 25–44) or Very Poor (PCI = 0–24)** Pavements that have extensive amounts of distress and require major rehabilitation or reconstruction
- **No Data**

Bay Area PCI = 65
The regional PCI score is an average of the scores of all participating jurisdictions, weighted by centerline miles.

Source: Metropolitan Transportation Commission

93 cities and nine counties reporting

PCI = pavement condition index, a measure of pavement distress

55 of 102 jurisdictions provided updated databases to MTC for 2002. For other jurisdictions, MTC used its pavement management system software to project 2002 conditions based on the latest data available. (See note on page 57.)

by most Bay Area jurisdictions measures visible pavement distresses, such as cracking or patching.

While the average PCI rating of 65 falls into the "good" category, it is at the low end of the range. And because approximately 75 percent of a pavement's serviceable life has been expended by the time its PCI rating falls to 60, the region's average score suggests that a significant portion of the Bay Area's local roadway network is due for major rehabilitative work, which will require a sizable future investment.

At present, the Bay Area as a whole is not meeting the level of expenditure required to maintain the condition of its pavement over time. Indeed, tight budgets have forced many jurisdictions into a "worst first" approach, in which only the streets in dire need are repaired and preventive maintenance is not funded. In the long run, this triage-like practice is expensive, since it costs approximately five times as much to rehabilitate or reconstruct deteriorated pavement as it does to keep roads in better condition through routine maintenance.

MTC estimates a current, cumulative maintenance backlog of $2.9 billion for local road repairs. This figure represents the cost of upgrading pavement in the region to the point where it is cost-effective to maintain. For most roads, this is a PCI between 75 and 85.

Shown below is a list of the Bay Area jurisdictions with the best and worst pavement conditions, based on the most recent survey data. A complete listing of all 102 jurisdictions (out of 109 in the region) for which data is available may be found in Appendix D.

A Closer Look – The Bay Area jurisdictions with the best and worst average pavement conditions are shown below. Often a jurisdiction's low average pavement condition rating is the result of a roadway maintenance budget that is insufficient to cover a backlog of needs.

Bay Area Jurisdictions With Best and Worst Pavement Conditions, 2002

Best	2002 PCI[1] (out of 100)	Worst	2002 PCI (out of 100)
1. City of Santa Clara	86	93. San Mateo	56
2. Brentwood	85	Sausalito	56
3. Los Altos	84	95. Marin County *(unincorporated)*	54
4. Contra Costa County *(unincorporated)*	83	96. Monte Sereno	53
5. Foster City	82	Richmond	53
Oakley	82	98. El Cerrito	52
Sunnyvale	82	100. Sonoma County *(unincorporated)*	50
8. Vacaville	81	101. City of Napa	49
Fairfield	81	102. Half Moon Bay	48
10. Campbell	80	Petaluma	48

Source: Metropolitan Transportation Commission

102 of 109 jurisdictions reporting

[1] PCI = pavement condition index; PCI of 100 = Excellent

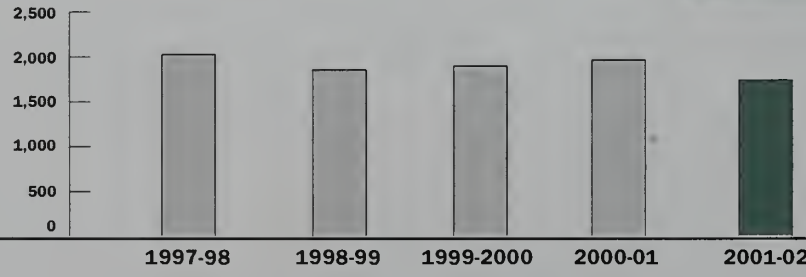
Emergency Transit Repairs Dip in 2001-02 as Railcar Reliability Improves

The region's transit rolling stock improved its reliability record in 2002, led by a sharp dip in the rate at which railcars required emergency maintenance service calls. According to statistics compiled by the Federal Transit Administration, the Bay Area's seven largest bus and rail operators responded to calls for service 1,743 times for every million miles of service provided in fiscal year 2001-02, a decrease of 11 percent from the prior year. The rate of railcar service calls dropped by more than a quarter, declining 26 percent to 480 per million miles of service. Bus-related service calls also declined, but at a more modest 4 percent clip.

Longer term, the improvement in the service-call rate is even more marked, with service calls overall declining by 14 percent since 1997-98 levels. Railcar service call rates are down by a third over this period. The improving service-call picture can be traced in part to regional-level funding decisions on the part of MTC that give a high priority to the replacement and rehabilitation of worn-out rail vehicles and buses. (The service-call rate tends to be correlated with both the maintenance practices of individual transit operators and the age of the equipment in their fleets.) During the period presented here, Muni replaced most of its old light-rail vehicles (which had been experi-

Service Calls — Seven Largest Bay Area Transit Operators, Fiscal Years 1997-98–2001-02

	Service Calls per Million Miles of Transit Service					Percent Change	
	1997-98	1998-99	1999-2000	2000-01	2001-02	FY 2000-01–2001-02	FY 1997-98–2001-02
Bus[1]	1,312	1,297	1,339	1,316	1,262	–4%	–4%
Rail[2]	716	562	561	652	480	–26%	–33%
Total	**2,028**	**1,858**	**1,900**	**1,968**	**1,743**	**–11%**	**–14%**



Source: Federal Transit Administration

[1]Includes AC Transit, SamTrans, Muni, Valley Transportation Authority (VTA), Golden Gate Transit

[2]Includes Caltrain, BART, Muni light rail, VTA light rail

encing reliability problems) while simultaneously taking steps to improve its preventive maintenance program. Likewise, BART has revised its trouble-shooting procedures, and is also beginning to reap the reliability benefits of its rehabilitated fleet of railcars. For their part, Golden Gate Transit and AC Transit have replaced a substantial number of buses.

The number of service calls per million miles of service provided is a good general indicator of the condition of the transit system. A service call is defined as any time service is interrupted in order to repair a vehicle or other key facet of the transit system, such as a switching device or power supply for a rail line. Like private automobiles, transit vehicles and systems tend to need more frequent repairs as they age.

Airports and Seaports

The Bay Area has three major airports (San Francisco International Airport, Oakland International Airport and San Jose International Airport) and five major seaports (San Francisco, Oakland, Redwood City, Benicia and Richmond). Airports and seaports are included in this report because they serve as regional gateways and generate considerable ground traffic by cars, trucks and rail. Statistics on air passengers and air and marine cargo are presented to track changes in traffic generated by airports and seaports.

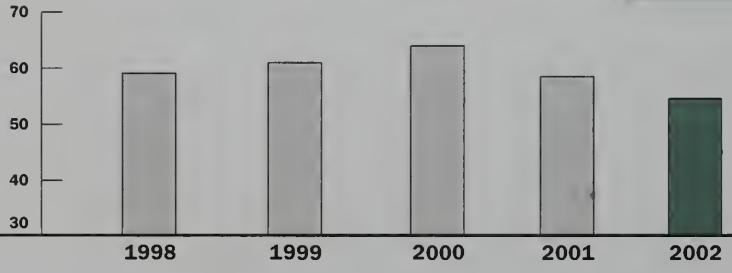
Slowdown in Air Travel and Trade Continues to Take Toll on Area Airports; Oakland Flies Solo in Bucking Downdraft

The lingering impacts of a weak economy and the September 11, 2001 terrorist attacks caused a second straight year of decline in the number of air passengers and the tonnage of air cargo passing through Bay Area airports. The number of air passengers shrank by almost 4 million, a 7 percent drop. Air cargo fared better, but still was off by 1 percent compared to the year-earlier level. In the two years since hitting their high-water mark in 2000, passenger air travel and air cargo shipments are off by 15 percent and 20 percent, respectively. These trends are not unique to the Bay Area, of course, but they mark a dramatic reversal of the growth in both measures in the years preceding.

Passenger traffic at the region's largest airport, San Francisco International, fell 9 percent in 2002 after dropping 15 percent the year prior. United Airlines, which accounts for nearly half of all operations at SFO, experienced serious financial difficulties last year, eventually declaring bankruptcy. With these problems besetting its leading carrier and amidst an overall slump in business and pleasure travel, SFO was unable to avoid its second straight year of declining passenger volumes. In the South

Air Passengers at Bay Area Airports, 1998 – 2002

	Millions of Passengers[1]					Percent Change	
Airport	**1998**	**1999**	**2000**	**2001**	**2002**	**2001–2002**	**1998–2002**
San Francisco	39.3	39.6	40.3	34.0	30.8	–9%	–22%
Oakland	9.2	9.9	10.6	11.4	12.7	+11%	+38%
San Jose	10.5	11.6	13.1	13.1	11.1	–15%	+6%
Total	**59.1**	**61.0**	**64.0**	**58.5**	**54.6**	**–7%**	**–8%**



Sources: Port of Oakland, San Jose International Airport, San Francisco International Airport

[1]Measured by enplanements and deplanements.

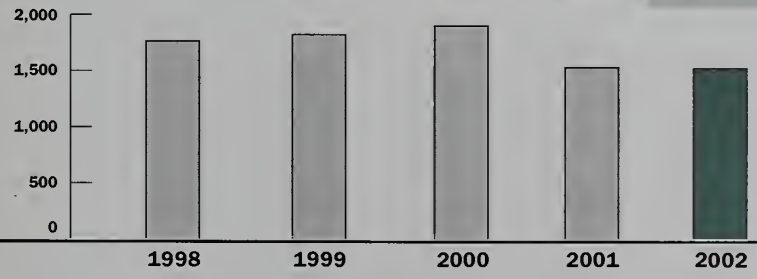
Bay, San Jose International Airport saw passenger travel decline by 15 percent in 2002, nearly erasing several years of steady gains during the tech boom years in the late 1990s.

Standing in stark contrast to the broader regional falloff in airborne activity is the growth recorded by Oakland International Airport, where both air passenger and air cargo volumes registered increases in 2002. The number of passengers utilizing Oakland International's facilities rose by 1.3 million people – 11 percent – in a year in which overall passenger volumes at the region's airports declined by almost 4 million people. This is on top of an 8 percent increase in the prior year, when passenger volumes fell by 9 percent regionwide.

In 2002, low-fare carriers Southwest and Jet Blue continued to expand service at Oakland and succeeded in attracting new passengers, and other carriers added new cross-country service. In the cargo area, though Oakland has struggled in recent years along with both San Francisco and San Jose, it was helped in 2002 by a Federal Aviation Administration decision to limit the amount of cargo that passenger flights may carry. As the local hub for both Federal Express and UPS, Oakland International benefited from the resultant diversion of some air freight to cargo-only carriers. This put the East Bay airport back on a growth path, and in 2002 Oakland International surpassed San Francisco International in the volume of air cargo tonnage handled.

Air Cargo at Bay Area Airports, 1998 – 2002

	Thousands of Tons of Cargo[1]					Percent Change	
Airport	**1998**	**1999**	**2000**	**2001**	**2002**	**2001–2002**	**1998–2002**
San Francisco	851	929	962	701	650	–7%	–24%
Oakland	779	755	775	671	717	+7%	–8%
San Jose	133	143	163	159	155	–3%	+16%
Total	**1,764**	**1,827**	**1,900**	**1,531**	**1,522**	**–1%**	**–14%**



Sources: Port of Oakland, San Jose International Airport, San Francisco International Airport

[1]One ton = 2,000 pounds

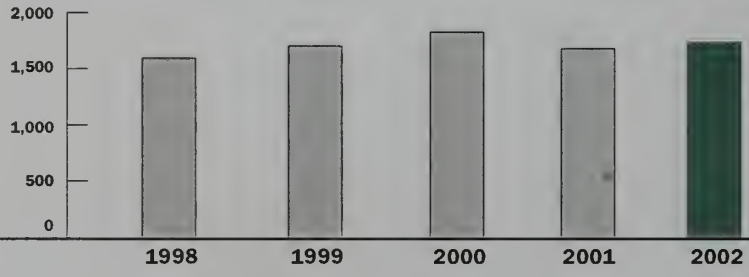
Container Cargo Gains Ground Despite Slow Economy, But Bulk Freight Falls Back

It was a tale of two cargoes for the Bay Area in 2002. Containerized cargo, consisting largely of high-value manufactured parts (such as computers, electronics and auto parts), rebounded modestly from the down year suffered in 2001, while bulk cargo (mainly sand, petroleum, cement and wood products) failed to reach the level attained a year ago. Interestingly, the Port of San Francisco sailed against the prevailing tide in both areas; containerized cargo volumes fell by a third while bulk cargo shot up by 50 percent.

The Port of Oakland accounted for the entire increase in containerized cargo (as measured by the industry-standard "twenty-foot equivalent units" TEUs), registering a 4 percent uptick after falling back 7 percent in 2001. Still, cargo levels remain below those achieved in 2000, indicating that the prolonged slump affecting the Bay Area economy has yet to run its course. Container traffic passing through the Port of Oakland accounts for the largest share of tonnage and value of marine cargo at Bay Area ports. Oakland handles about 98 percent of the region's container traffic.

Container Marine Cargo at Bay Area Seaports, 1998 – 2002

	Thousands of TEU[1] Containers					Percent Change	
Seaport	**1998**	**1999**	**2000**	**2001**	**2002**	**2001–2002**	**1998–2002**
Oakland	1,575	1,664	1,777	1,644	1,708	+4%	+8%
San Francisco	19	40	50	35	24	–32%	+28%
Total	**1,594**	**1,703**	**1,827**	**1,679**	**1,732**	**+3%**	**+9%**



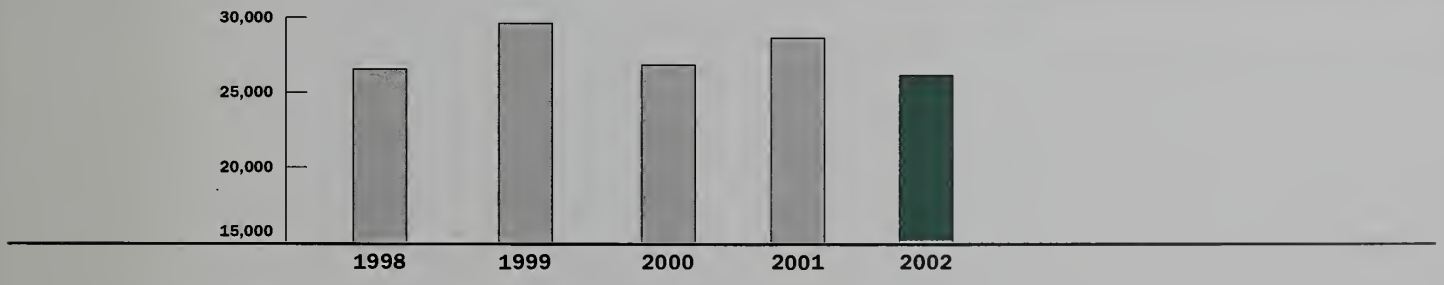
Sources: Ports of Oakland and San Francisco

[1]TEU = Twenty-foot equivalent

Bulk freight volumes definitely felt the effects of the sluggish economy in 2002. Overall tonnage was down 9 percent from 2001 levels, which helped tip the longer-range, 1998–2002 trend into negative territory as well. Most of the decrease can be traced to the drop in cargo at the Port of Richmond, which handles the most tonnage and a large volume of oil and gasoline. The Port of San Francisco stood out as an exception to the slumping activity at other ports. Due largely to higher volumes (made possible by the opening of new dry bulk facilities near the end of 1998) of imported construction products, such as concrete, tonnage crossing the docks of San Francisco soared by 49 percent in 2002, growing from 925 tons to 1,379 tons. All other bulk cargo ports saw tonnage decline last year.

Bulk Marine Cargo at Bay Area Seaports 1998 – 2002

	Thousands of Tons of Bulk Cargo					Percent Change	
Seaport	**1998**	**1999**	**2000**	**2001**	**2002**	**2001–2002**	**1998–2002**
Richmond	22,554	25,167	22,541	24,185	21,977	–9%	–3%
Oakland	2,610	2,080	1,861	1,901	1,445	–24%	–45%
San Francisco	85	937	942	925	1,379	+49%	+1522%
Redwood City	797	1,045	1,103	1,124	1,016	–10%	+27%
Benicia	508	389	405	497	316	–36%	–38%
Total	**26,554**	**29,618**	**26,851**	**28,633**	**26,133**	**–9%**	**–2%**



Sources: Ports of Benicia, Oakland, Redwood City, Richmond, San Francisco

Note: One ton = 2,000 pounds

Appendix A:
Notes on Data Collection

NOTES ON DATA COLLECTION

This compendium of key data on the state of the Bay Area transportation system is intended to provide the best snapshot possible, given existing information collected by Bay Area transportation agencies. Because the data have been gathered by multiple sources, responding to varying requirements, differences exist with respect to methodology, frequency, time period covered, level of detail and other variables. Following are some general comments, plus specific discussions of data by category.

Time Period Covered

Most data is collected and reported by calendar year (January 1 to December 31). Transit data is collected and reported by state fiscal year (July 1 to June 30), as is the custom for accounting purposes. Truck counts on freeways and state highways are collected by federal fiscal year (October 1 to September 30) because federal roadway funding is based, in part, on traffic counts.

Every effort was made to assemble consistent data for 1998 through 2002 (or, for data collected by fiscal year, 1997-98 through 2001-02). In some cases, this simply was not possible because data was not collected or analyzed for some years, or because of a lag in data availability. For example, the latest truck counts available at the time of publication were for fiscal year 2000-01.

Future Data Collection

In the future, the authors expect to collect supplemental data to fill gaps in the existing data. For example, traffic volumes on local roadways are not included in this report. While individual cities and counties collect traffic counts for various purposes, there is little consistency among jurisdictions in the timing or location of data collection. As a result, it is extremely difficult to aggregate the data and summarize it at the regional level. MTC is collecting traffic volumes on a selected set of local roadways for inclusion in the 2004 report.

Additionally, emerging technologies promise to make more complete data available in the future. Some of the techniques used to gather data for this report are labor-intensive, and therefore costly. For example, Caltrans employees drive specially equipped vehicles to collect data on freeway congestion, and transit operators hire people to wait at bus terminals to record on-time performance. Often, agencies can afford to collect data just a few, "typical" days a year due to the high costs of these manual data collection methods.

Examples of emerging data collection technologies that are expected to improve data in future reports include the following.

- Sensors in the freeway pavement and on the roadside will continuously count vehicles and monitor travel speeds on freeways. Whereas traffic counts now are taken just a few days a year, this automated data would be available 24 hours a day, 365 days a year, giving us a much more accurate understanding of roadway conditions. This information will be sent to Caltrans' Transportation Management Center in Oakland, where it will be used to manage freeway traffic flow, provided in real time to travelers seeking information on congestion, and archived for use in reports such as this one.

- Sensors will use FasTrak™ electronic toll tags installed in autos and trucks to estimate the time it takes to travel between fixed points on the freeway, 24 hours a day, 365 days a year. The first sensors are expected to be operational in the Interstate 80 corridor in late 2003.

- "Smart" traffic signal systems will continuously count vehicles on local roadways. These systems will be deployed on only a small subset of streets in the near future, however, so most traffic counts on local roadways will continue to be done by traditional methods on an occasional basis.

- Transit fleet management systems will track the times that buses and trains arrive and depart transit stops. By comparing these times to transit schedules, the systems will generate more complete on-time performance statistics.

Data Collection Techniques Used for This Report

System in Brief

Population and Employment Trends (page 3)

Population data is taken from the California Department of Finance estimates. The estimates in this report reflect population as of July 1 of each year. City and county population estimates are available at <www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm#estimates>.

Employment data is taken from the California Employment Development Department (EDD) "Wages and Salary" data series. EDD estimates annual employment by industry based on reports by employers to the state on employment securities and unemployment insurance. Self-employed workers, unpaid family workers, private household workers, and individuals on unpaid leave from work are not included in the data. Because it is the number of jobs rather than workers that is reported, workers holding more than one job may be counted more than once. Employment data is published on the EDD Web site at <www.calmis.cahwnet.gov>.

Trends in Commuting (page 4)

The annual Commute Profile telephone poll conducted by RIDES for Bay Area Commuters, Inc. provides information on commuter behavior and the factors that influence commute decisions. It is the only region-wide, annual study of commuters' perceptions, such as whether people feel their commutes have improved or worsened over the past year. The poll, which is conducted in the spring of each year, surveys adults who are employed full-time outside the home. The size of the poll has varied over the years based on the amount of funding available. In 1998, the sample size was about 1,600 Bay Area commuters. Since 1999, the poll has included approximately 3,600 of the Bay Area's estimated 3.5 million commuters each year. The Commute Profile report includes a complete description of the survey methodology and the confidence level. Copies of the report are available from RIDES for Bay Area Commuters, Inc. or can be downloaded from <http://rideshare.511.org/research/>.

Mobility: Getting Around the Bay Area

Freeway Congestion (pages 8-11)

The measure used to indicate congestion is daily vehicle hours of delay. Delay occurs when the average speed falls below 35 miles per hour for 15 minutes or more. Caltrans District 4 has collected this data every year since 1981 (except for 1985 and 1997, when budget limitations forced the district to forgo the program). Caltrans employees drive specially equipped vehicles on the freeway system during morning and evening commute hours to collect information on average travel speeds and travel times, which is then used to calculate daily delay. Data is collected on Tuesdays, Wednesdays and Thursdays during the spring and fall of each year. Complete freeway congestion data for the Bay Area is published by Caltrans in the report series *Bay Area Freeway Congestion Data*.

Selected Commute Times (pages 12-15)

It is possible to calculate the driving time between two locations from the data Caltrans District 4 collects to monitor freeway congestion (see above). Because data is available for freeway travel only, the reported commute times do not account for the time it takes to drive from one's home to the freeway or from the freeway to one's workplace. The driving times included in this report were calculated based on an 8:30 a.m. arrival at the destination cities — San Francisco, Oakland and San Jose.

For the 2003 report, MTC staff calculated the time it would take to travel by transit from the same general locations to each destination city to arrive no later than 8:30 a.m. The transit travel times were calculated from printed schedules or, where available, by using MTC's TakeTransit℠ Trip Planner (available at <http://transit.511.org>). The transit travel times are the time between transit stops or stations. Like the freeway travel times, they do not include the time it takes to get from home to the first transit stop or from the last transit stop to the workplace.

Freeway Traffic Volumes (pages 16-17)

The annual average daily traffic volume is the number of vehicles that pass by a given freeway location during the course of a year, divided by 365. The traffic volumes included in this report are for locations with permanent count stations. Only a small number of locations have permanent counters that provide data on a continuous basis from year to year. Caltrans collects traffic counts at other freeway and state highway locations with electronic instruments that are moved from location to location throughout the state on a seven-year cycle. Locations with these cyclic traffic counts were omitted from this report because the data does not show year-to-year trends. The complete database of traffic volumes throughout the state is available on the Caltrans Web site at <www.dot.ca.gov/hq/traffops/saferesr/trafdata/>.

Bridge Traffic Volumes (page 16)

The Bay Area Toll Authority, which has administered the first dollar of the $2 toll on state-owned bridges since 1998, tracks the number of vehicles crossing each of the seven state-owned bridges. Traffic counts reflect vehicle crossings in the tolled direction for accounting purposes. The Golden Gate Bridge, Highway and Transportation District tracks this number for the Golden Gate Bridge. The average daily traffic for each bridge is the total annual traffic divided by 365 days. Data on traffic and revenue for the seven state-owned bridges is available on the Bay Area Toll

Notes on Data Collection (continued)

Authority Web site at <www.mtc.ca.gov/bata/tolls.htm>. Data on traffic and revenue for the Golden Gate Bridge is available on the Web at <www.goldengatebridge.org/research/GGBTraffToll.html>.

Truck Traffic (pages 18-19)

Annual average daily truck traffic is the total number of trucks that pass by a given location in a year, divided by 365 days. All trucks with more than two axles are counted. Two-axle trucks over 1.5 tons with dual rear tires also are counted. Excluded are pickup trucks and vans with only four tires. Annual average truck volumes are calculated for the federal fiscal year, which runs from October 1 to September 30.

Caltrans conducts truck counting throughout the state in a program of continuous sampling on a six-year cycle. Certain locations with truck weigh stations, including one Bay Area location, are monitored continuously; however, most routes are monitored only once or twice in a six-year period. As a result, the data is best suited to track changes over multiple years rather than annual changes. At the time of this report, data for fiscal year 2000-01 was the most current data available. Data on truck volumes throughout the state is available on the Caltrans Web site at <www.dot.ca.gov/hq/traffops/saferesr/trafdata/>. This information also is published annually by Caltrans in the report series *Annual Average Daily Truck Traffic on the California State Highway System*.

Carpool Lanes — Time Savings and Usage (pages 20-23)

Caltrans District 4 collects data on carpool-lane usage and travel-time savings annually. Data on lane usage is compiled from direct observations by people situated on the side of the freeway adjacent to the carpool lanes. Travel-time savings are computed by comparing travel time in the carpool lane with that in the adjacent mixed-flow lanes during the peak morning and evening commute hours. For carpool lanes that are not congested, travel time is based on the speed limit on the freeway. For carpool lanes that are congested, Caltrans drives specially equipped "floating cars" to record travel time and speed. The same "floating car" technique is used to measure the travel time in adjacent mixed-flow lanes. Caltrans District 4 publishes a report annually with complete data on carpool-lane usage and travel-time savings. The report also includes detailed information on the hours of operation, number of people using the carpool lane compared to adjacent general purpose lanes, and violation rates.

Local Traffic (pages 24-25)

Under state law, county congestion management agencies are charged with monitoring congestion on local roadways. Two Bay Area counties, Sonoma County and Napa County, have exercised an option in the law to opt out of this requirement. The remaining seven counties monitor congestion on local roadways and publish the results at least every two years in a county congestion monitoring report. Most counties report in odd years; Alameda and Contra Costa counties report in even years. Santa Clara County has been reporting every year.

The congestion management agencies measure local roadway congestion by calculating the "level of service" on a selected set of high-priority roads during peak commute periods. Level of service describes traffic conditions based on speed and travel time, volume and capacity, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Level of service is expressed in grades from A through F, with level of service A representing the best operating conditions and level of service F the worst. At level of service A, B and C, traffic flows smoothly and delay is minimal. This report characterizes these conditions as "uncongested." At level of service D and E, traffic flow becomes unstable, conditions characterized in this report as "moderately congested." At level of service F, traffic is stop and go, characterized in this report as "severely congested."

The level of service grade is assigned based on the delay experienced by vehicles traveling through major intersections or on average travel speeds over selected segments of local roadways. It is noteworthy that the procedures for monitoring local roadway level of service are established on a county-by-county basis. As a result, it is more appropriate to compare the results for each county from year to year than it is to compare results across different counties. Links to congestion management agencies for counties in the Bay Area may be found on the MTC Web site at <www.mtc.ca.gov/links/lkindex.htm>.

Transit On-Time Performance (pages 26-27)

Transit operators monitor on-time performance as a measure of the quality of the service they provide. Like most data on transit operations, on-time performance is reported by fiscal year. Data is usually collected by persons who record the arrival time of individual transit vehicles at key stops. (BART's central computer system automates collection of on-time performance data.) On-time performance data is used by operators primarily as an internal management tool. When deteriorating on-time performance can be traced back to increasing roadway congestion, the data may be

used to develop more realistic, revised schedules. San Francisco Muni publishes on-time performance data in its quarterly performance reports as required under Proposition E, passed by San Francisco voters in 1999.

Transit Ridership (pages 28-29)

This report uses transit boardings as a measure of ridership. A boarding refers to each time a passenger enters a transit vehicle or train station. One person may board multiple vehicles to complete a trip. Methods used to collect this ridership data include tracking transit fare receipts and hiring people to count passenger boardings. Transit operators report ridership for each fiscal year to the Federal Transit Administration for inclusion in the National Transit Database. MTC summarizes transit ridership and other operating statistics for Bay Area operators in its annual report, *Statistical Summary of Bay Area Transit Operators*, which covers a rolling five-year period.

Safety

Motor Vehicle Collisions and Motor Vehicle Collisions Involving Pedestrians or Cyclists (pages 32-35)

The California Highway Patrol (CHP) maintains the most complete data on motor vehicle collisions, including those that involve pedestrians or cyclists. The database, called Statewide Integrated Traffic Records System, includes all collisions reported to local law enforcement as well as the Highway Patrol. The Highway Patrol publishes the series *Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions*, which includes summary statistics by county and for the entire state. This is available on the Web at <www.chp.ca.gov/html/publications.html>. Data at a less aggregated level can be requested from the California Highway Patrol. (Note: the 2002 collision data displayed on pages 32-35 is preliminary and is subject to confirmation by CHP.)

Transit Safety Statistics (pages 36-37)

The *State of the System* report uses the number of injuries and fatalities involving transit as a measure of transit safety. In 2002, the Federal Transit Administration significantly modified reporting requirements for safety and security incidents. We have chosen not to publish transit safety statistics for fiscal year 2001-02 due to concerns about the quality of the data reported during this transition period. Instead, statistics from the 2002 *State of the System* report have been repeated here. Data quality is expected to improve in future years as the transit operators get used to the new requirements, and the most current transit safety data should be included in future reports.

The statistics represent a wide range of incidents ranging from people who slip and fall while boarding a bus to those injured or killed in collisions with transit vehicles. The statistics include patrons, employees and other individuals if they are injured or killed on transit property or by transit vehicles. Transit operators report injuries and fatalities to the Federal Transit Administration as part of the National Transit Database project. The National Transit Database also includes statistics on system security (robberies or vehicle thefts, for example). Security statistics for Bay Area transit operators may be included in future reports. Data on individual Bay Area transit operators and national statistics are currently available on the Web at <www.ntdprogram.com/>.

State of Repair

Freeway Pavement Conditions (pages 40-41)

The condition of freeway pavement is measured in terms of the International Roughness Index (IRI), an indicator of ride comfort. Caltrans surveys pavement condition using roving vehicles that measure the deviation from a smooth surface in inches per mile. A lower IRI indicates less deviation from a smooth surface, or better ride quality.

For the most rigid pavement surfaces — slabs of pavement connected by joints — IRI ratings of 213 or less are considered acceptable by Caltrans. For seamless-style pavement surfaces, IRI ratings of 224 or less fall within the acceptable range.

Local Roadway Pavement Conditions (pages 42-43)

Most Bay Area jurisdictions use MTC's Pavement Management System, or an equivalent system, to track conditions of streets and roads and develop cost-effective repair schedules. MTC's Pavement Management System measures pavement conditions according to a pavement condition index (PCI) that ranges from 0 to 100, where 100 is the best possible score. Surveyors record the type and severity of pavement distresses, such as cracking, weathering and patching through physical inspections. This information is then entered into the Pavement Management System to calculate the PCI.

The characterization of pavement conditions in 2002 is based on the most recent data submitted to MTC by local jurisdictions. For those jurisdictions (55 in number) that had their last inspections done in 2002, the PCI scores were considered current. For

the remaining jurisdictions — those whose most recent inspections were done in years prior to 2002 — MTC staff used its Pavement Management System software to project PCI scores forward to 2002, relying on estimates (provided by individual jurisdictions or by the State Controller's Office) of revenue available to each jurisdiction for local roadway maintenance.

Transit Service Calls (pages 44-45)

A service call occurs any time transit service is disrupted because a transit vehicle cannot complete a scheduled trip or cannot start the next scheduled trip. Transit operators report total service calls to the Federal Transit Administration as part of the National Transit Database. Operators also report the miles of service provided annually (annual revenue service miles) as part of the National Transit Database. MTC used these data to calculate the total number of service calls per million miles of service provided by the seven largest bus and rail operators.

Airports and Seaports

Airports — Passenger and Cargo Volumes (pages 48-49)

Statistics on airport passengers are based on information supplied to the airports from the airline carriers' computer reservation systems. These numbers are in turn used to collect landing fees from the carriers and for planning efforts at the airports. Statistics on air cargo are reported by private carriers to the airports. Private carriers (e.g., Federal Express, UPS) submit tonnage reports to the airports for planning and billing purposes.

Seaports — Marine Cargo Volumes (pages 50-51)

Private operators at the ports collect data on marine cargo. For bulk goods, tonnage is tracked and used by the ports to collect fees. For containers, fees are paid to the port based on the contents of the containers and the number of total containers is tracked for planning purposes.

Appendix B:
Congested Freeway Locations – Morning and Evening Commutes, 2002

Morning Peak-Period Congested Locations, 2002 (ordered by county and route)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
ALA	24	E	1,270	6:30-9:45	Route 13 to Caldecott Tunnel
ALA	24	W	400	7:05-9:20	At Telegraph Avenue
ALA/CC	80	W	9,710	5:45-9:30	Willow Avenue to Bay Bridge metering lights
ALA	84	S	2,860	5:30-9:50	Newark to Dumbarton Bridge toll plaza
ALA	92	W	1,020	6:00-10:00	Clawiter to San Mateo-Hayward Bridge toll plaza
ALA	238	N	290	5:45-9:05	I-580 to East 14th Street
ALA	580	E	40	8:10-9:25	Central Avenue to Buchanan Street
ALA	580	W	700	6:00-7:45	At North Flynn Road
ALA	580	W	3,910	6:15-9:30	Vasco Road to Airway Boulevard
ALA	580	W	350	6:45-9:15	At El Charro Road
ALA	580	W	250	7:10-9:30	Redwood Road to Route 238
ALA	580	W	610	7:35-8:55	Coolidge Avenue to Fruitvale Avenue and at Park Boulevard
ALA	580	W	710	6:25-9:05	Route 24 to I-80
ALA	680	N	130	7:50-9:00	At I-580 and at Alcosta Boulevard
ALA	680	S	3,600	5:55-10:45	Sunol Road to Route 262
ALA	880	N	2,190	6:20-9:30	0.4 miles south of HOV lane split to Bay Bridge
ALA	880	N	760	7:25-9:15	At Fremont and north of Whipple to Route 92
ALA	880	N	120	7:35-8:30	At Route 238
ALA	880	N	200	7:50-9:05	Route 238 to Marina Boulevard
ALA	880	N	280	7:50-9:00	Hegenberger Road to High Street
ALA	880	S	1,220	6:25-9:00	Hesperian Boulevard to Route 92
ALA	880	S	1,090	6:20-8:55	At north of Industrial and Whipple to Decoto Road
ALA	880	S	8,880	6:00-10:45	Thornton to Mowry and Stevenson to north of Dixon Landing Road
CC	4	W	430	7:00-8:20	Willow Pass Road (Bay Point) to Willow Pass Road (Concord)
CC	4	W	3,640	5:30-9:00	Hillcrest Road to Loveridge Road
CC	24	W	900	7:20-9:15	St. Stephens to Caldecott Tunnel
CC	24	W	220	7:35-9:05	I-680 to east of Pleasant Hill Road
CC	242	S	100	6:45-8:30	Concord Avenue to I-680
CC	580	W	320	6:30-9:00	Marine Street undercrossing to Richmond-San Rafael Bridge toll plaza
CC	680	N	400	7:35-9:10	Sycamore Valley Road to El Pintado Road

County abbreviations: ALA=Alameda; CC=Contra Costa; MRN=Marin; SCL=Santa Clara; SF=San Francisco, SM=San Mateo; SOL=Solano; SON=Sonoma

Morning Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
CC	680	S	2,010	6:55-9:35	Route 24 to Diablo Road
CC	680	S	900	6:35-8:40	Route 242 to Geary Road and at North Main Street
CC	680	S	310	6:35-8:35	At Concord Avenue/Contra Costa Boulevard
CC	680	S	840	6:35-8:50	At Benicia-Martinez Bridge toll plaza and north of Arthur Road to Route 4
MRN	101	S	90	7:10-9:15	At I-580 and north of Route 131
MRN	101	S	3,520	6:35-10:00	Rowland Boulevard to I-580
SCL	17	N	180	7:50-9:10	Camden Avenue to Hamilton Avenue
SCL	85	N	310	6:10-9:00	At Bernal Road on-ramp (metering lights)
SCL	85	N	470	7:00-9:30	Route 17 to 0.8 miles north of Winchester Boulevard
SCL	85	N	760	7:10-9:00	I-280 to north of Fremont Avenue
SCL	85	N	520	7:10-9:00	At U.S. 101 junction
SCL	87	N	40	9:20-10:00	Curtner Avenue to Almaden Expressway
SCL	101	N	990	5:30-8:30	Dunne Avenue to Burnett Avenue overcrossing
SCL	101	N	220	7:00-8:50	At Tully Road
SCL	101	N	2,170	7:00-9:30	I-280 to Trimble Road
SCL	101	N	190	7:30-9:20	Route 85 to Renstorff Avenue
SCL	237	E	30	7:50-8:50	Route 85 to Dana Street
SCL	237	E	80	8:00-9:10	At Mathilda Avenue and at McCarthy Boulevard
SCL	237	W	280	7:15-9:10	I-880 to Zanker Avenue
SCL	280	N	1,570	7:15-8:15	U.S. 101 to I-880
SCL	280	N	220	7:45-9:10	North of Winchester Boulevard to Saratoga Avenue
SCL	280	N	40	7:10-8:10	Route 85 to 1 mile north of Foothill Expressway
SCL	680	N	150	7:30-8:20	Capitol Expressway to McKee Road
SCL	680	S	210	6:45-8:00	At U.S. 101
SCL	880	N	1,240	6:45-10:00	North First Street to Brokaw Road
SCL	880	S	100	7:30-8:40	Montague Expressway to U.S. 101
SF/ALA	80	W	460	6:05-8:35	Incline section of Bay Bridge to Fremont Street
SF	80	E	1,260	7:05-9:50	U.S. 101 to Sterling Street
SF	101	S	180	7:40-9:10	I-280 to Harney Way
SF	101	N	1,020	7:25-9:45	Alemany Avenue to I-80
SF	101	N	70	6:35-9:30	At Fell Street offramp
SF	101	S	30	7:30-9:35	At I-80

Morning Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
SF	280	N	470	7:10-8:40	Monterey Boulevard to U.S. 101
SF	280	N	150	7:30-9:10	Indiana Street to King Street
SM	92	W	30	7:45-8:10	U.S. 101 to Alameda De Las Pulgas
SM/SCL	101	S	1,100	7:15-9:15	Whipple Avenue to Route 85
SM	101	N	110	8:00-9:10	Marsh Road to Woodside Road
SM	101	N	340	7:30-9:00	Route 92 to Third Avenue and at Peninsula Avenue
SM	101	S	460	7:10-9:00	Third Avenue to Hillsdale Boulevard
SM	101	S	210	7:10-8:30	Holly Road to Whipple Avenue
SM	101	S	400	7:30-9:10	San Francisco International Airport to Broadway
SM	101	S	150	7:50-8:50	Marina Boulevard to Linden Avenue
SM	280	S	420	7:30-9:00	Route 1 to Avalon Drive
SOL	37	W	70	6:40-8:40	At Skaggs Island Road and at Sonoma/Solano county line
SOL	37	W	220	6:10-8:15	Postmile 4 to Skaggs Island Road and Railroad Avenue (Mare Island) to Postmile 6
SOL	80	W	570	6:10-8:00	Georgia Street to west of Sonoma Boulevard
SOL	80	W	950	6:00-8:20	West of Oliver Street to east of Cordelia truck scales
SOL	680	S	120	6:35-8:15	South of Industrial Way to Benicia-Martinez Bridge toll plaza
SOL	780	E	190	6:15-7:55	East Second Street to Benicia-Martinez Bridge toll plaza
SON	101	S	570	5:45-8:05	South of Redwood Highway to north of Kastania Road
SON	101	S	160	6:25-9:20	At Route 12
SON	101	S	210	7:15-8:55	At Steele Lane
SON	101	S	200	7:15-8:50	South of Airport Boulevard to River Road
SON	101	N	630	7:10-9:15	North of Golf Course Drive to north of Baker Road

Evening Peak-Period Congested Locations, 2002 (ordered by county and route)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
ALA	24	E	1,150	3:30-6:45	Claremont Avenue to Caldecott Tunnel
ALA/SF	80	E	1,150	3:25-6:15	At Sterling Street and county line to I-580
ALA	80	E	2,520	3:05-7:00	I-580 to Gilman Street
ALA/SF	80	W	1,090	5:05-6:55	Incline section of Bay Bridge to Fifth Street
ALA	80	W	530	3:20-6:10	Buchanan Street to I-580/880
ALA	84	N	160	3:25-6:15	Newark Boulevard to I-880
ALA/SM	92	E	1,180	3:30-6:45	San Mateo/Alameda county line to I-880
ALA	238	N	270	3:00-6:45	I-580 to East 14th Street
ALA	238	S	500	3:45-6:35	I-880 to Route 185
ALA	580	E	260	3:35-7:05	At Route 84
ALA	580	E	7,040	2:55-6:40	Hopyard Road to west of El Charro Road
ALA	580	E	990	4:35-6:45	Route 24 to Coolidge Avenue
ALA	580	W	220	4:00-7:00	Strobridge Avenue to Route 238
ALA	680	N	660	3:15-6:15	At Scott Creek and at Route 262 to Washington
ALA	880	N	850	2:50-8:10	South of Fremont Boulevard to Auto Mall Parkway
ALA	880	N	690	3:40-6:20	At Stevenson Boulevard and north of Route 84 to Decoto Road
ALA	880	N	2,360	3:00-6:50	Fremont Boulevard to Tennyson Road
ALA	880	N	310	4:10-7:05	Route 92 to south of Hesperian Boulevard
ALA	880	N	230	3:20-4:55	At south of High Street
ALA	880	S	370	3:30-6:05	At Tennyson Road
ALA	880	S	600	4:10-7:05	Hesperian Boulevard to Route 92
ALA	880	S	120	4:45-6:15	At Hegenberger Road and at Marina Boulevard
CC	4	E	580	3:45-7:00	Route 242 to Port Chicago Highway
CC	4	E	1,710	3:35-7:00	Bailey Road to Loveridge Road
CC	4	E	430	3:25-7:20	East of Loveridge to L Street
CC	24	E	190	3:50-6:00	At Acalanes and at I-680
CC	24	W	1,340	3:15-7:30	West of Camino Pablo to Caldecott Tunnel
CC/ALA	80	E	530	4:00-6:30	Buchanan Street to San Pablo Avenue
CC	80	E	340	4:00-6:15	El Portal Road to Pinole Valley Road
CC/SOL	80	E	240	3:10-6:25	At Carquinez Bridge toll plaza
CC	680	N	870	3:45-6:35	North of Bollinger Canyon Road to Sycamore Valley Road and El Cerro Boulevard to El Pintado Road

County abbreviations: ALA=Alameda; CC=Contra Costa; MRN=Marin; SCL=Santa Clara; SF=San Francisco, SM=San Mateo; SOL=Solano; SON=Sonoma

Evening Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
CC	680	N	830	3:55-6:00	Stone Valley Road to Treat Boulevard
CC	680	N	940	3:20-6:50	At Route 4 and Arthur to Benicia-Martinez Bridge toll plaza
MRN	101	S	990	4:25-7:20	End of Waldo Tunnel to beginning of Golden Gate Bridge
MRN	101	N	2,060	2:45-6:15	North of Seminary Drive to Mission Avenue
MRN	101	N	680	3:20-6:25	North of De Long Avenue to beginning of expressway
MRN	101	N	270	3:15-6:30	At Sanitary Road
MRN	580	W	800	2:40-6:50	Bellam Road to U.S. 101
SCL	85	S	70	5:00-5:50	At Route 87
SCL	85	S	190	4:30-7:00	Route 17 to south of Union Avenue
SCL	85	S	200	5:00-7:00	Saratoga Avenue to 1 mile south of Saratoga Avenue
SCL	85	S	470	4:45-7:00	Stevens Creek Boulevard to De Anza Boulevard
SCL	85	S	780	4:00-7:00	Evelyn Avenue to Fremont Avenue
SCL	87	S	1,640	3:00-8:00	I-280 to Alma Avenue
SCL	101	S	2,100	2:45-6:30	Bernal Avenue to 1 mile south of Route 85
SCL	101	S	1,360	4:30-7:15	East Santa Clara Street to Tully Road
SCL	101	S	2,050	4:10-7:00	Great America Parkway to 13th Street
SCL	101	N	30	5:30-6:30	At Great America Parkway
SCL	101	N	1,540	4:15-7:15	Ellis Street to Rengstorff Avenue
SCL/SM	101	S	1,300	4:20-7:00	University Avenue to Shoreline Boulevard
SCL	237	E	100	4:30-6:20	North First Street to Zanker Road
SCL	237	E	170	4:30-6:20	At I-880 junction (connector)
SCL	237	W	240	5:30-6:15	U.S. 101 to Dana Street
SCL	237	W	130	5:10-7:10	At Zanker Road
SCL	280	N	70	5:20-6:15	At I-880 junction and on Route 237/I-880 connector
SCL	280	S	1,290	4:00-6:30	Route 17/I-880 to 11th Street
SCL	280	S	200	5:00-6:40	Wolfe Road to Lawrence Expressway
SCL	280	S	150	5:10-6:20	El Monte Road to Magdalena Avenue
SCL	680	S	900	4:15-6:40	Montague Expressway to Berryessa Road
SCL	680	N	810	4:00-6:00	Calaveras Road to Scott Creek Road
SCL	880	S	150	5:20-6:45	U.S. 101 to I-280
SCL	880	S	2,020	3:00-7:50	Great Mall Parkway to Brokaw Road
SCL	880	N	3,660	3:15-7:10	Montague Expressway to Dixon Landing Road

Evening Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
SF	80	E	4,310	2:50-7:45	I-80/U.S. 101 to Sterling Street
SF	80	W	50	4:50-6:10	5th Street to U.S. 101
SF	101	N	1,650	3:10-6:35	Cesar Chavez Street to I-80
SF	101	N	170	3:55-6:15	U.S. 101/I-80 to Fell Street
SF	101	S	140	3:45-5:35	South Van Ness to I-80
SF	280	N	60	5:05-6:25	6th Street to King/5th Street
SF/SM	280	S	210	5:05-6:25	At U.S. 101 and at Route 1
SF	280	S	90	4:55-6:20	Mariposa Street to Pennsylvania Avenue
SM	92	W	50	5:15-6:10	U.S. 101 to Route 82
SM	92	E	1,380	3:00-7:00	0.4 miles east of Foster City Boulevard to 1.5 miles west of Alameda/San Mateo county line
SM	101	N	1,180	4:00-7:00	Marsh Road to Ralston Avenue
SM	101	N	810	5:00-7:00	Route 92 to Third Avenue
SM	101	N	30	5:30-6:00	Broadway to Milbrae Avenue
SM	101	S	110	4:50-5:50	At Woodside Road
SM	101	S	80	5:00-5:50	North of Broadway
SM	101	S	110	3:30-4:30	At Milbrae Avenue
SM	280	N	360	5:20-6:45	Alpine Road to north of Sandhill Road
SM	280	N	470	5:00-7:00	Crystal Springs Avenue to Westborough Boulevard
SM	380	W	20	5:15-6:15	At I-280
SOL	37	E	170	3:45-6:10	At Route 121
SOL	80	E	740	3:30-6:10	West of Jameson Canyon Road (Route 12) to Cordelia truck scales
SOL	80	E	100	5:10-6:10	East of Magellan Road to east of Travis Boulevard
SOL	680	N	760	3:05-6:15	South of Cordelia Street to I-80
SON	101	N	100	4:25-6:05	North of E. Washington Avenue
SON	101	N	120	3:50-6:10	At Redwood Highway
SON	101	N	1,420	2:30-6:45	At Santa Rosa Avenue and north of Todd Road to south of Steele Lane
SON	101	S	860	2:35-6:25	North of Hopper Avenue to Route 12

Appendix C:
Injury and Fatal Motor Vehicle Collisions Involving Bicyclists and Pedestrians by Bay Area Jurisdiction, 2002

Injury and Fatal Motor Vehicle Collisions Involving Bicyclists and Pedestrians by Bay Area Jurisdiction, 2002

	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
JURISDICTION	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
Alameda County								
Alameda	0	34	34	33	0	29	29	34
Albany	0	11	11	7	0	5	5	7
Berkeley	1	126	127	113	1	129	130	143
Dublin	1	4	5	5	0	2	2	5
Emeryville	0	8	8	9	0	7	7	6
Fremont	4	59	63	68	0	66	66	65
Hayward	2	73	75	78	1	49	50	58
Livermore	1	16	17	21	0	33	33	34
Newark	1	11	12	10	0	11	11	11
Oakland	15	302	317	295	1	129	130	167
Piedmont	0	3	3	2	0	2	2	1
Pleasanton	1	14	15	12	0	16	16	17
San Leandro	1	33	34	37	0	26	26	24
Union City	1	13	14	14	0	9	9	11
Unincorporated Alameda County	0	40	40	57	0	47	47	38
Alameda County Total	**28**	**747**	**775**	**763**	**3**	**560**	**563**	**620**
Contra Costa County								
Antioch	1	24	25	23	0	20	20	23
Brentwood	1	10	11	7	0	7	7	5
Clayton	0	0	0	1	0	1	1	1
Concord	0	11	11	42	0	8	8	56
Danville	0	6	6	5	0	12	12	12
El Cerrito	0	15	15	14	0	13	13	11
Hercules	0	0	0	2	0	0	0	0
Kensington	0	0	0	1	0	0	0	1
Lafayette	0	3	3	4	0	8	8	5
Martinez	0	9	9	7	0	7	7	6
Moraga	0	0	0	1	0	1	1	2
Oakley	0	4	4	1	0	5	5	2
Orinda	0	7	7	4	0	5	5	2
Pinole	2	3	5	7	0	2	2	4
Pittsburg	0	17	17	18	0	7	7	7

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

JURISDICTION	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
Pleasant Hill	1	10	11	12	0	17	17	20
Richmond	3	59	62	54	1	23	24	33
San Pablo	0	16	16	22	1	10	11	11
San Ramon	0	6	6	6	0	5	5	7
Walnut Creek	0	20	20	20	1	22	23	27
Unincorporated Contra Costa Co.	3	33	36	39	0	31	31	39
Contra Costa County Total	**11**	**253**	**264**	**287**	**3**	**204**	**207**	**277**
Marin County								
Belvedere	0	0	0	0	0	0	0	0
Corte Madera	0	3	3	3	0	20	20	10
Fairfax	0	6	6	2	0	1	1	4
Larkspur	0	6	6	3	0	2	2	4
Mill Valley	0	4	4	6	0	0	0	5
Novato	1	9	10	16	0	27	27	25
Ross	0	1	1	1	0	2	2	1
San Anselmo	1	3	4	6	0	10	10	9
San Rafael	1	35	36	37	0	37	37	44
Sausalito	0	3	3	3	0	17	17	17
Tiburon	0	0	0	1	0	0	0	2
Unincorporated Marin County	0	9	9	12	2	41	43	36
Marin County Total	**3**	**79**	**82**	**89**	**2**	**157**	**159**	**156**
Napa County								
American Canyon	0	2	2	1	0	3	3	2
Calistoga	0	4	4	2	0	2	2	2
Napa	0	34	34	29	0	35	35	38
St. Helena	0	4	4	4	0	6	6	5
Yountville	0	1	1	1	0	0	0	0
Unincorporated Napa County	0	3	3	3	0	9	9	13
Napa County Total	**0**	**48**	**48**	**40**	**0**	**55**	**55**	**61**
San Francisco (City and County)								
San Francisco Total	**21**	**856**	**877**	**934**	**1**	**308**	**309**	**379**

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

JURISDICTION	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
San Mateo County								
Atherton	0	2	2	2	0	1	1	5
Belmont	0	4	4	7	0	3	3	7
Brisbane	0	1	1	1	0	0	0	1
Burlingame	0	20	20	16	0	9	9	9
Colma	0	3	3	3	0	0	0	1
Daly City	2	45	47	39	1	11	12	10
East Palo Alto	0	23	23	23	0	9	9	14
Foster City	0	2	2	3	0	4	4	6
Half Moon Bay	0	6	6	4	0	7	7	5
Hillsborough	0	1	1	2	0	3	3	2
Menlo Park	1	13	14	17	0	19	19	21
Millbrae	0	2	2	7	0	2	2	4
Pacifica	0	7	7	8	0	4	4	4
Portola Valley	0	0	0	0	1	2	3	2
Redwood City	0	44	44	36	0	39	39	41
San Bruno	0	18	18	20	0	4	4	11
San Carlos	0	10	10	10	0	7	7	8
San Mateo	0	36	36	46	0	42	42	53
South San Francisco	1	22	23	26	0	14	14	19
Woodside	0	0	0	0	0	9	9	10
Unincorporated San Mateo Co.	1	11	12	15	0	38	38	37
San Mateo County Total	**5**	**270**	**275**	**286**	**2**	**227**	**229**	**270**
Santa Clara County								
Campbell	2	6	8	7	1	12	13	14
Cupertino	0	13	13	14	0	24	24	32
Gilroy	1	8	9	11	0	10	10	11
Los Altos	0	8	8	10	0	24	24	23
Los Altos Hills	0	0	0	0	0	4	4	5
Los Gatos	0	3	3	7	0	8	8	14
Milpitas	0	12	12	15	0	14	14	19
Monte Sereno	0	1	1	0	0	1	1	0

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
JURISDICTION	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
Morgan Hill	1	7	8	5	0	7	7	8
Mountain View	3	10	13	22	0	43	43	50
Palo Alto	1	26	27	27	0	66	66	78
San Jose	23	257	280	361	3	262	265	328
Santa Clara	1	21	22	30	0	26	26	39
Saratoga	0	0	0	3	0	17	17	15
Sunnyvale	1	28	29	32	0	34	34	47
Unincorporated Santa Clara Co.	1	11	12	16	1	31	32	33
Santa Clara County Total	**34**	**411**	**445**	**560**	**5**	**583**	**588**	**716**
Solano County								
Benicia	0	6	6	7	0	4	4	6
Dixon	1	5	6	5	0	2	2	3
Fairfield	4	38	42	41	0	23	23	37
Rio Vista	0	4	4	1	0	3	3	1
Suisun City	0	6	6	6	0	3	3	6
Vacaville	0	14	14	15	0	22	22	21
Vallejo	1	50	51	48	0	25	25	33
Unincorporated Solano County	0	4	4	5	0	5	5	5
Solano County Total	**6**	**127**	**133**	**129**	**0**	**87**	**87**	**111**
Sonoma County								
Cloverdale	0	1	1	1	0	2	2	3
Cotati	0	1	1	3	0	2	2	4
Healdsburg	0	0	0	3	0	4	4	4
Petaluma	0	20	20	22	1	18	19	30
Rohnert Park	0	10	10	8	0	11	11	12
Santa Rosa	2	54	56	57	1	62	63	83
Sebastopol	0	4	4	5	0	6	6	7
Sonoma	0	5	5	7	0	5	5	5
Windsor	0	2	2	2	0	3	3	3
Unincorporated Sonoma County	1	22	23	28	1	27	28	41
Sonoma County Total	**3**	**119**	**122**	**136**	**3**	**140**	**143**	**191**
BAY AREA TOTAL	**111**	**2,910**	**3,021**	**3,223**	**19**	**2,321**	**2,340**	**2,782**

Appendix D:
Pavement Condition of Bay Area Jurisdictions, 2002

Pavement Condition Index (PCI) for Bay Area Jurisdictions

2002 Average PCI	Jurisdiction	2001 Average PCI[2]
Very Good		
86[1]	City of Santa Clara	80
85[1]	Brentwood	85
84	Los Altos	86
83	Contra Costa County (unincorporated)	82
82	Foster City	73
82[1]	Oakley	84
82	Sunnyvale	78
81	Fairfield	72
81[1]	Vacaville	74
80	Campbell	76
79	Danville	79
79[1]	Livermore	74
78[1]	Concord	78
78[1]	Pinole	78
77[1]	Emeryville	70
77	Fremont	72
76[1]	Pleasant Hill	79
76[1]	South San Francisco	74
75[1]	City of Alameda	76
75[1]	Gilroy	76
75[1]	Newark	74
75[1]	San Ramon	75
75[1]	Windsor	81
Good		
74	Alameda County (unincorporated)	79
74	Benicia	73
74	Mountain View	77
74[1]	Redwood City	69
73	Belvedere	86
73[1]	Dixon	75
72	Cupertino	79
72	Daly City	73

2002 Average PCI	Jurisdiction	2001 Average PCI[2]
Good		
72[1]	Los Altos Hills	73
72	Los Gatos	65
72	Morgan Hill	76
72[1]	Orinda	72
72[1]	Tiburon	69
71[1]	Martinez	70
71[1]	Yountville	70
70[1]	Atherton	76
70	City of Sonoma	70
70[1]	Clayton	71
70[1]	Corte Madera	72
69	Antioch	71
69[1]	Brisbane	73
69	Cloverdale	69
69	Hayward	68
69[1]	Milpitas	71
69[1]	Portola Valley	73
69	Rohnert Park	72
68	Novato	71
68[1]	Pleasanton	68
68	San Carlos	68
67[1]	Colma	67
67	Cotati	69
67[1]	Dublin	70
67	Pacifica	69
67[1]	Saratoga	68
66	Piedmont	73
66[4]	San Francisco (City and County)	68[4]
66	San Jose	59
66	Santa Rosa	70
66	Solano County (unincorporated)	57
65[1]	Healdsburg	65

Pavement Condition Index (PCI) for Bay Area Jurisdictions (continued)

2002 Average PCI	Jurisdiction	2001 Average PCI[2]
Good		
65[1]	Hillsborough	67
65	San Bruno	61
64[1]	Hercules	72
64	Napa County (unincorporated)	55
64	San Leandro	63
64	Santa Clara County (unincorporated)	64
63[1]	American Canyon	79
63[1]	Belmont	66
63	Mill Valley	66
63	Ross	65
63	San Pablo	60
63	Suisun City	69
63	Woodside	61
62	Burlingame	77
62	Calistoga	54
62	East Palo Alto	59
62	Moraga	NA
62	Rio Vista	NA
62	San Anselmo	65
62	San Mateo County (unincorporated)	53
61	Fairfax	45
61	Sebastopol	64
61[1]	St. Helena	61
Fair		
60[1]	Albany	64
59	Berkeley	66
59	Lafayette	60
59	Menlo Park	67
58	Pittsburg	69
57	Vallejo	59
56[1]	San Mateo	64
56[1]	Sausalito	56
54	Marin County (unincorporated)	57
53[1]	Monte Sereno	NA
53[1]	Richmond	54
52[1]	El Cerrito	54
50	Sonoma County (unincorporated)	46
49[1]	City of Napa	53
48[1]	Half Moon Bay	43
48[1]	Petaluma	51
No Data		
NA	Larkspur	53[3]
NA	Millbrae	NA
NA	Oakland	NA
NA	Palo Alto	NA
NA	San Rafael	71[3]
NA	Union City	NA
NA	Walnut Creek	NA

Source: Metropolitan Transportation Commission

2002 PCI scores based on pavement databases updated in 2002 unless noted.

[1] PCI score is an estimate based on inspections done between 1999 and 2001. (See note on page 57.)

[2] PCI score is based on inspections done between 1998 and 2001.

[3] Jurisdiction uses an alternate pavement management system in which scoring scale is comparable with PCI.

[4] Score has been correlated to the PCI scale from an alternate pavement management system.

NA = not available

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